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A REPRESENTATIVE CITY OF THE BUCKEYE STATE

The "Gem City" of Ohio—Large Number of Improved Streets—Splendid Water Department—Unexcelled Sewer System—Fire Service Above the Average—Trouble from Electrolysis—Some Improvements Needed

By the Editor

AMONG the cities of the Middle West, Dayton is conspicuous for its broad, clean and well paved streets, charming vistas, splendid water supply, excellent sewer system and well conducted administrative departments. It is one of the busiest manufacturing centres of the State. Just outside of the city limits is located one of the seven National Soldiers' and Sailors' Homes, with nearly 6,000 members enrolled. It is noted for its beautiful grounds.

When incorporated as a city, in 1841, Dayton had but 6,100 population and no industries. To-day it has nearly one hundred thousand inhabitants and manufactories which are known the world over. Together with other Ohio cities it has suffered from "ripper" legislation and its present charter is not sufficiently comprehensive, so that its executive and administrative functions are crippled. Many times the officials are charged with neglect, ignorance or worse, when, if the truth were known, the defective charter is to blame. The present Legislature may adopt the municipal code bill, which is the result of several years' work by Commissioners Kibbler of Newark and Pugh of Columbus, and so remedy the evil which afflicts not only Dayton but nearly every Ohio city. There is no State in the Union, with perhaps the exception of Pennsylvania, where such a reform is more needed. Like all other cities, Dayton has its weak points, but with the "mongrel" charter under which it is now working, the wonder is that a worse fate has not befallen it. The fairly good conditions, which now obtain, were only achieved by a healthy public spirit and the services of the faithful city officials. By the limitations of the charter, the responsibilities of the mayor are few, but the moral tone, dignity and standard of the chief executive have much to do in influencing the affairs of the city. The

present incumbent, Hon. Jesse R. Lindemuth, will close his second term next month, and will leave city affairs in a prosperous condition. His administration marks the most progressive period of the city. Pronounced reforms or improvements have been achieved in nearly every part of the public service, brought about through him and his able assistants.

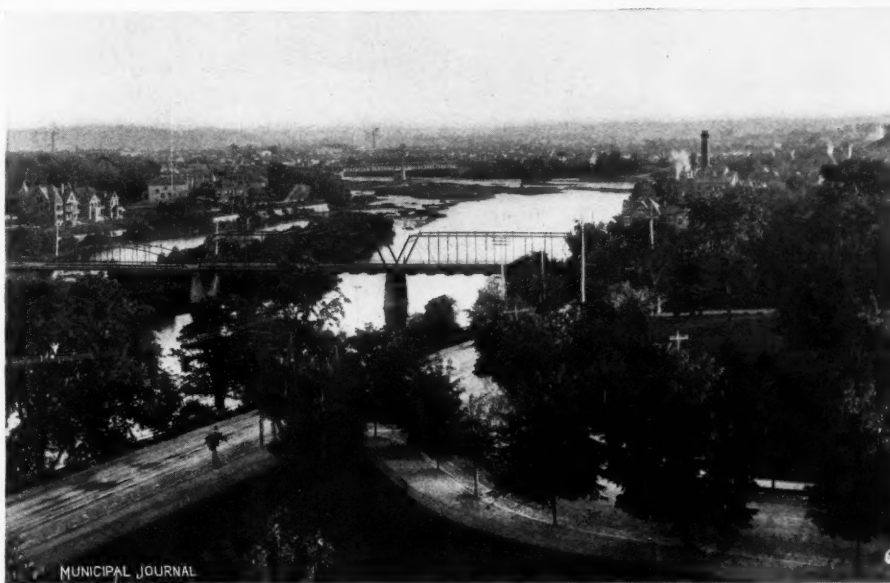
The city is greatly in need of parks. The aggregate area—twelve acres—devoted to parks includes all the little triangles, small squares and the like, which is the merest apology for a park system. As compared with the other cities of the United States it stands at the foot of the list. Its park commission was only organized in

1900, which is given the munificent support of less than \$3,000 per year! An expenditure of at least \$20,000 a year, for the next ten years, is the only thing which will place the city on a respectable footing in this particular, with others of its class. Here is an opportunity for some of its public-spirited individuals or corporations.

As will be seen in a table elsewhere, the financial standing of the city compares favorably with others. Its total bonded indebtedness amounted to \$2,822,000 on January 1, 1902, of which

\$1,564,000 had been expended for general purposes and \$828,000 for the water works. While the actual valuation is placed at \$100,000,000, the assessed valuation for 1902 has been fixed at \$45,364,300, with a tax rate of \$26.80 on each thousand dollars. The debt of the city has been gradually reduced since 1895, and the proportionate increase in the assessed valuation and the tax rate has been about the same, while the expenditures for improvements and maintenance have increased each year.

The public school system, buildings and equipments are among



A BIRDSEYE-VIEW OF DAYTON



J. R. LINDEMUTH,
Mayor

the best in the United States, as is also the public library. The health department is not what it should be; which is rather the fault of the character than the present administration.

The health officer is only paid for a small portion of his time, when the size and importance of the city needs the services of a man of Dr. King's ability all the time, with larger space assigned to the department together with an adequate appropriation. It was only last summer that an attempt was made to inspect and regulate the sale of milk. During the short interval of the enforcement of suitable rules and regulations, calculated to maintain the purity and

quality of the milk, particularly during the summer months, there has been a marked decrease in the number of deaths among children of five years of age and under. During Health Officer King's régime a modern hospital for the care of smallpox cases has been erected and equipped, located in one of the most beautiful spots surrounding the city and within about two miles and a half from its centre. It is not dubbed "The Pest House," but has been named the "Quarantine Hospital," which is preferable to the old name. As compared with Rochester, N. Y., and even some larger cities, Dayton has the best hospital for this purpose.

Police and Fire Departments

A year or so ago the city had a police department that was anything but a credit to it, as it well knew. Some of the evils unearthed in removing the cause, were equal to anything shown up in New York's last campaign. One of the efforts to bring about a healthy

FIRE DEPARTMENT STATISTICS

	No. of regulars.	Alarms.	Fires.	Property loss.	Cost of main- tenance.
Albany, N. Y.	124	629	629	\$154,347	\$136,070
Cambridge, Mass.	57	281	263	91,146	90,363
Portland, Ore.	50	322	151	73,810	79,181
Atlanta, Ga.	108	432	388	75,876	110,570
Grand Rapids, Mich.	127	449	392	129,538	110,797
Dayton, O.	131	430	382	125,661	77,977
Richmond, Va.	68	330	323	339,408	91,630
Nashville, Tenn.	85	234	226	*	81,945
Seattle, Wash.	73	292	269	82,377	93,774
Hartford, Conn.	64	198	198	150,000	120,595
Reading, Pa.	27	94	94	92,447	43,620

* Not reported.

POLICE STATISTICS

	Police- men.	Licensed saloons. No.	Amount license.	Arrests for drunk- enness.	Total arrests.	Cost of main- tenance.
Albany, N. Y.	162	408	\$500	864	2,719	\$156,939
Cambridge, Mass.	107			1,738	3,397	\$123,775
Portland, Ore.	53	267	400	908	3,364	52,837
Atlanta, Ga.	161	104	† 1,000	4,244	15,632	\$142,197
Grand Rapids, Mich.	84	170	511	780	1,679	77,464
Dayton, O.	65	422	350	369	4,737	70,665
Richmond, Va.	100	314	250	1,419	4,860	103,062
Nashville, Tenn.	95	217	72	2,204	9,795	\$85,862
Seattle, Wash.	78	187	600	1,186	9,175	68,963
Hartford, Conn.	98	167	\$450	2,671	4,612	122,094
Reading, Pa.	51	167	500	603	1,490	62,896

* Not including twenty-three supernumeraries. † For sale of beer only, \$200.
‡ Including expenditures for police courts, jails, etc. § For sale of beer only, \$250.

change consisted of a weeding out process, from the chief down, effected by the board of police commissioners before a new chief was selected. Then, after much deliberation, the commissioners departed from the usual course and put at the head of the force a man who had never had a day's experience on any police force, and who knew nothing about the administration of such a department—

STREET CLEANING STATISTICS

	Swept by hand or machine.	Swept by city, sq. yds. per week.	Persons employed by city.	Cost of main- tenance.
Albany, N. Y.	Both	1,490,720	63	\$34,185
Cambridge, Mass.	Mach.	700,000	39	60,500
Portland, Ore.	Both	2,041,600	50	34,095
Atlanta, Ga.	Mach.	1,627,956	24	†
Grand Rapids, Mich.	Both	1,000,000	100	36,000
Dayton, O.	Hand	1,521,738	30	20,789
Richmond, Va.	Both	4,526,850	89	34,578
Nashville, Tenn.	Both	636,000	90	13,060
Seattle, Wash.	Both	590,415	30	10,074
Hartford, Conn.	Both	1,333,445	48	62,823
Reading, Pa.	Hand			

† Included in expenditures for health department.

and that man was a commercial traveller. This man, without any previous experience in this line, but with an irreproachable character, a sound judgment and the courage of his convictions, has infused a new spirit into the force and brought about a better state of affairs in Dayton. He has made mistakes and will doubtless make others, but he can be depended upon not to make the same error twice. The department needs a larger appropriation and at least fifteen additional patrolmen. With the assistance of the Gamewell police telegraph system, Chief Whitaker keeps close "tab" on his men and makes a practice of going out at all hours of the day and night on inspection tours, so that his men are never sure when they will receive a call from him.

THE FIRE SERVICE

There is no better fire department in the United States, than that under the management of Chief D. C. Larkin. It is fully equipped—much better than the average—and has a total of 112 men on the pay roll. Politics do not enter into the administration of its affairs in any manner whatsoever. The department is governed by a board of commissioners of which the chief is secretary. The chief is the purchasing agent and makes every dollar go as far as it will. By various economies in the purchase of supplies and equipment he saves, during the year, several times the amount of his salary. This department is one of two in the United States which undertakes the duties of an insurance patrol and in training certain men of every company so that they will be able to give first aid to the injured. After every fire the men, with dust pan and broom, pails, water and sponges, clean up thoroughly, so that a house is left in almost as neat a condition as before the fire. This is of considerable benefit to the insurance companies, and the citizens in general like the plan. The statistics for the past ten years, which have been collected by the National Board of Fire Underwriters, place this department in the front rank among the cities of this country.

"The Gamewell fire alarm telegraph," said the chief, "is indispensable to the modern fire department. We could not do business without it. We believe, moreover, that there is no economy in getting along with the fewest number of fire call boxes; it is far better to be liberal in this matter." More than a score of pieces of apparatus are equipped with the Grant roller bearing axle and the



E. J. LEO,
President Council

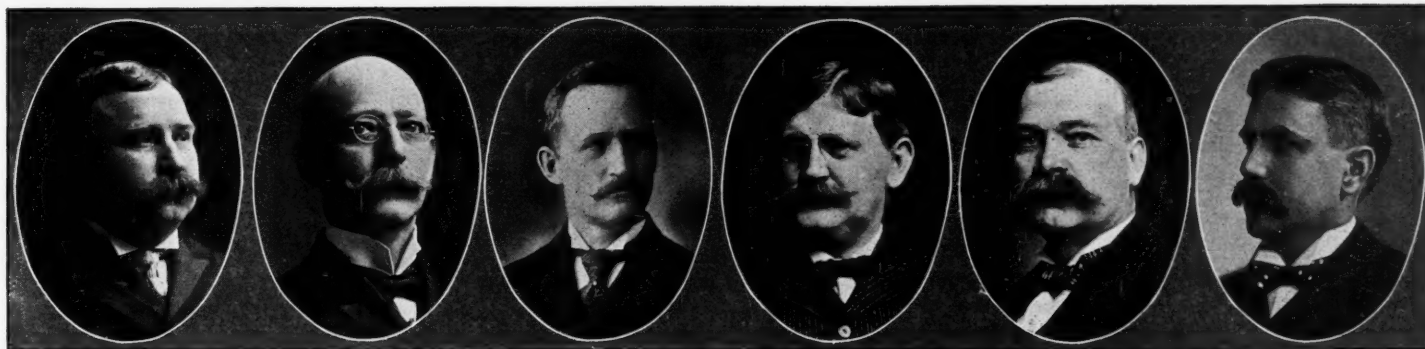
R. H. FERGUSON,
Comptroller

JOHN C. WHITAKER,
Superintendent Police

OSWALD CAMMANN,
President Park Commission

DR. FRANK FIFE,
President Board Education

E. P. MATTHEWS,
City Solicitor

JOHN A. HAHNE,
City ClerkG. F. KUHN,
Chairman B. C. A.CHARLES E. ROWE,
Secretary W. W. B.F. M. TURNER,
City EngineerD. C. LARKIN,
Chief of Fire DepartmentC. W. KING,
Health Officer

Kelly rubber tires are being introduced as rapidly as possible. Among the rolling stock are two double extra, first size La France engines, the largest horse engines in the world, each having a capacity of 1,300 gallons per minute. There are several Ahrens and Metropolitan engines in service of smaller size, and the Larkin relief valves and Siamese deluge sets are used effectively. Taken altogether, with the Hale water tower, the Babcock type of chemical engines, Babcock service trucks, Hayes aerial trucks, life nets, smoke pro-

flow from these ninety-four wells will not be far from 40,000,000 gallons per day.

Twelve hundred feet from where the 60-inch main branches off from the 66-inch pipe, there is a 30-inch "Y." From this "Y" a 30-inch suction main is carried back to the pumping house. It has no wells connected with it at present, and will be used in emergency cases when the other line is out of repair.

The suction lines running up and down the river, from the 66-inch suction header, have a fall of one inch to every one hundred feet. This prevents the formation of air pockets in the pipes and makes an easy connection with the vacuum pumps at the power station.

From June 1, 1900, to the last of December, 1901, improvements to the amount of \$110,000 have been made, consisting of the laying of 2,000 feet of 60-inch cast iron suction pipe, a portion of the work on which is shown in an illustration elsewhere. The pipe was furnished by the United States Cast Iron Pipe and Foundry Company.

A new Holly pumping engine has recently been installed, with a daily capacity of ten million gallons, which brings the total daily pumping capacity of the plant up to 39,000,000 gallons. As the largest amount of water pumped during any one day last year was 8,275,371 gallons, the present capacity will be large enough to meet any demands upon the plant for the next ten years at least.

EQUIPMENT AND FINANCES

It is interesting to note that the system has about 149 miles of street mains of various sizes, 1,140 fire hydrants, nearly 12,000 service connections and nearly 6,000 meters. The fire hydrants were supplied by the Bourbon Copper and Brass Works, of Cincinnati; the valves by the Rensselaer Manufacturing Company, of Troy, N. Y., and the meters by the Pittsburg Meter Company, National Meter Company, Hersey Manufacturing Company, Neptune Meter Company and the Thomson Meter Company.



PUMPING STATION OF WATER WORKS SYSTEM

tectors, there are many reasons why Dayton is to be congratulated upon the excellence of its fire department.

The Water Department

The water supply of Dayton, like that of many other Western cities, is obtained from driven wells, which are distributed along the bed of the Mad river for a distance of over 3,000 feet. The depth of the wells varies from twenty-five to eighty feet. All new wells are of eight-inch galvanized iron pipe, with a Cook brass strainer eight to ten feet long at the bottom. Each well is cut off at the proper elevation with the suction pipe and a "T" casting fitted on the top. The top branch of the "T" is threaded for taking the plugs and a nine-inch wrought iron pipe casing, both of which extend to the surface of the ground. By this means a well may be gotten into without excavating. The horizontal branch of the "T" leads to the suction pipe. Before reaching the suction pipe a valve is set in the branch in order to shut off each well independently.

The water is collected from the wells by a series of suction mains. Leading from the pumping station to the river is a 66-inch main or header, 300 feet long, from which a 32-inch main leads down the river, for a distance of 612 feet. Twenty-two wells are located on this main, eight of which were driven last season. During the dry season these twenty-two wells gave 7,500,000 gallons of water in twenty-four hours on a test.

There are two other suction mains which run up the river, the longest for a distance of 1,900 feet, being connected with an aggregate number of seventy-two wells. It is estimated that the total



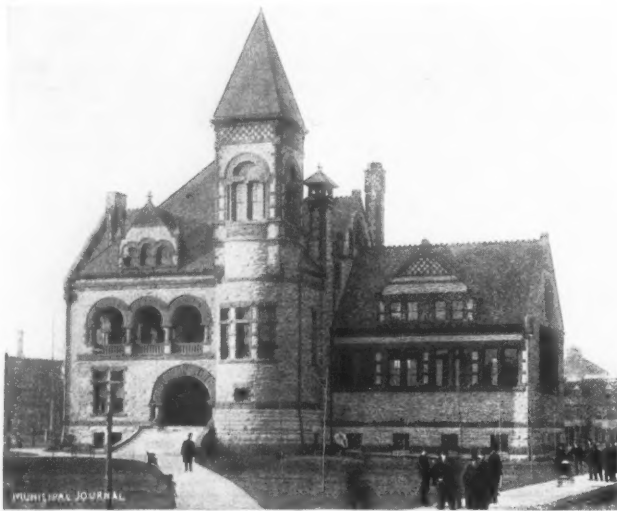
SHOWING INSTALLATION WORK ON 60-INCH MAINS

The water works are governed by a board of three trustees: Messrs. B. B. Childs, president; Arthur Giesler and C. A. Lucius, of which Mr. Charles E. Rowe has been the secretary since 1890, previous to which he had served three years as assistant secretary. Mr.

Rowe is well known in water works circles, and he takes great pride not only in improving his own department, but in promoting the general betterment of water supplies throughout the country. He has served as the treasurer of the Central States Water Works Association for the past five years, and at the session of the American Water Works Association in New York last summer he was elected a vice-president.

The policy of the department has been largely directed by Mr. Rowe, and the excellent results indicated by the following financial statement are sufficient evidence of his efficiency. He is an enthusiastic meter advocate, and attributes the success of this municipal plant to their liberal use. He is gradually placing them on all service pipes—about 65 per cent. being now covered—and believes that he will be able to make a much better showing when every service is metered. The meter rate is 8 cents per thousand gallons, with a minimum charge of \$6 per year, and the flat rates are about the same as those in other cities.

The receipts for 1900 amounted to \$88,160.25; operating expenses, \$43,025.15; the net earnings amounting to \$45,135.09. The cost of construction and maintenance of the water works from their inception, in 1870, to Dec. 31, 1900, amounts to \$2,304,364.86, and the total



THE PUBLIC LIBRARY

income, during the same period, has been \$1,336,056.95, leaving the net cost of \$968,307.91. The bonded debt amounts to \$855,000.

TROUBLE FROM ELECTROLYSIS

The water mains have been greatly damaged by stray currents of electricity, which, it is alleged, have come from the trolley lines operating within the city limits. As soon as the discovery was made, after a careful investigation under the direction of Secretary Rowe, the City Solicitor, E. P. Matthews, Esq., was directed to bring action against the street railway companies to remedy the evil. As Mr. Matthews has made a thorough study of the situation, in order to conduct the city's case intelligently, he was asked to make a brief statement covering the matter. It is the first action of its kind brought by a municipality in the United States, against a street railway corporation, and will, therefore, be of special interest to our readers. His view of the case is as follows:

"There are eight companies operating single trolley electric street cars in the city, of which five are interurban, with power houses some distance from the city, and three are strictly city lines, with their power houses within the corporation. Electricity, as a motive power, was adopted by one of the city companies in 1889, and by the other two in 1895. It was discovered as long ago as 1896, that a species of injury, before unknown, was happening to both the water mains and service pipes, on streets where the electric lines operated. The pipes burst in a most unexpected manner, and upon examination those of cast iron were found to be pitted and full of soft spots, and those of lead were honey-combed and eaten clear through. Learning that this was probably due to electricity escaping from the rails of the street car companies, the city authorities caused an electric survey to be made of the water piping system, which dis-



THE UNION STATION

closed conditions under which the pipes would be damaged and ultimately destroyed by electrolysis.

"The water works trustees and street railroad people were unable to agree as to what should be done, and on November 15, 1899, suits were begun by the city against the three companies having power houses within the corporation, praying for a mandatory injunction to compel them to adopt such devices and system of traction as would keep the electricity off the pipes and thus prevent electrolysis.

THE CASE IN COURT

"The trial of one of these cases was begun in the Court of Common Pleas, before Judge O. B. Brown, October 14, 1901, and about eight weeks was occupied in hearing the evidence."

"The city alleged in its petition that the defendant has been and is allowing its return current to escape into the earth, whence it goes

PUBLIC PARKS AND SCHOOLS

	Parks.		Schools.		Main-tenance.
	Acres.	Main-tenance.	No. teachers.	No. pupils.	
Albany, N. Y.	266.43	\$35,057	21	325	\$308,964
Cambridge, Mass.	484.59	20,137	39	453	464,520
Portland, Ore.	205.29	8,639	29	301	245,417
Atlanta, Ga.	155.00	14,305	26	230	150,993
Grand Rapids, Mich.	136.26	21,073	36	371	274,608
Dayton, O.	12.00	2,207	* 32	387	294,855
Richmond, Va.	376.00	37,115	18	256	130,746
Nashville, Tenn.	8.40		19	226	167,358
Seattle, Wash.	353.70	5,903	23	236	223,843
Hartford, Conn.	512.85	24,378	22	331	322,276
Reading, Pa.	197.79	11,831	47	317	189,725

* Including two rented buildings.

upon the pipes, damaging and destroying them by electrolysis. This was denied by the company in its answer, but its witness admitted on the witness stand that the allegation is true. The evidence developed that both mains and service pipes have been injured by electrolysis, due to street railway currents. During the progress of the case a water main, about two miles from the pump house, and about 400 feet from the street railway power house, burst while fire pressure was on. A four foot piece of the ruptured pipe was cut out and brought into court with the mud and soil clinging to it, and was cleaned and examined in the presence of the judge. Pits



THE STEELE HIGH SCHOOL

and soft spots were found, and they ran together so that the pipe seemed to have lost all of its iron and to be merely a carbon tube, which could be whittled almost anywhere with an ordinary pocket knife.

THE DOUBLE TROLLEY AS A REMEDY

"It is immaterial to the city what the defendant does, so that it keeps its current off the pipes and ceases using them as part of its return circuit. The evidence on behalf of the city is to the effect that this can be accomplished only by the use of the double trolley, or its equivalent. That is, that insulated metallic conductors must be provided for both the outgoing and returning current, whereby the electricity will be kept from the ground and away from the pipes.

"The experts for the defendant say that where the single trolley is used, the pipes can be bonded to the dynamo with copper, and that the electricity will thus be drained from them without damage. This proposition is combated by the city, and it is claimed that witnesses were produced from places where the drainage system has been tried, and that they testified that it does not remedy the evil.

"The defendant company has never done anything to prevent electrolysis.

"The case will soon be in the hands of the Court and a decision may be looked for at no distant day.

"The water works officials of Dayton, speaking through their secretary, Mr. Chas. E. Rowe, who has labored unceasingly on the case, want it understood that while the electrolytic damage is severe in Dayton, there are other places where it is worse, and they believe that wherever a single trolley electric line exists in proximity to a system of underground pipes, electrolysis will be found to a greater or less extent."

How the Streets Are Improved

The engineering department has been under the personal direction of Mr. Frank M. Turner for a period of twelve years. He is ap-



FIRST STREET, LOOKING WEST, ASPHALTED, 1892

being governed by the amount of traffic on the street. The concrete is made of one part of natural cement, equal to the best quality of Louisville cement; two parts of clean, sharp sand and five parts of broken limestone thoroughly cleansed from rust and dirt, the broken lime-stone not to measure more than two and one-half inches. The sand and cement are thoroughly mixed dry and then made into a mortar, with the least possible amount of water. The broken stone is then mixed with this mortar and the concrete, thus formed, is spread upon the subgrade and rammed until free mortar appears on the surface. A layer of clean sand, one inch in thickness, is placed upon the concrete foundation to form a cushion for the brick paving.

HOW BRICK PAVEMENTS ARE LAID

The bricks are laid close together, and, in a true line, at right angles to the curbs, all joints being broken by a lap of at least three inches. The bricks are thoroughly rammed, or rolled, as may be

POPULATION, AREA AND ASSETS OF ELEVEN CITIES

	Popula- tion.	Area, acres.	Cash in treasury.	Cash and bonds in sinking fund.	City hall.*	Police depart- ment.*	Fire depart- ment.*	Schools.*	Libraries.*	Parks.*	Total assets.
Albany, N. Y.	94,151	7,196.60	\$297,537	\$1,496,702	\$470,000	\$76,243	\$410,928	\$946,000		\$1,241,146	\$8,060,796
Cambridge, Mass. ...	91,886	4,182.48	253,699	1,825,793	301,800	39,848	248,399	1,938,865	\$252,000	3,832,405	15,551,773
Portland, Ore.	90,426	25,600.00	392,380	2,794	700,000	30,000	339,146	1,131,419		730,000	9,193,851
Atlanta, Ga.	89,872	7,040.00	209,885	163,654	30,000	157,000	253,600	766,800		1,070,000	6,617,139
Grand Rapids, Mich..	87,565	11,200.00	411,376	151,176	325,000	87,529	209,405	1,189,400	67,600	347,050	5,178,652
Dayton, O.	85,333	6,880.00	437,589	474,025	265,000	29,791	400,000	1,369,924	567,000	640,000	6,719,658
Richmond, Va.	85,050	3,926.00	120,448	527,758	1,401,550	2,600	176,720	468,250		862,470	7,579,646
Nashville, Tenn.	80,865	6,083.00	118,720	10,038	400,000	4,000	325,825	466,000		10,000	5,269,825
Seattle, Wash.	80,671	21,237.00	371,549	65,755	65,755	12,646	210,696	839,000	33,386	296,151	4,376,976
Hartford, Conn.	79,850	11,102.00	107,121	516,003	511,582	112,507	273,476	2,390,931		437,641	7,776,346
Reading, Pa.	78,961	3,965.00	264,644	147,701	38,000	1,200	195,000	965,550	46,500	500,000	4,567,864

* Including land, buildings, apparatus, etc.

pointed by the Board of City Affairs for a term of two years. The notable needs of the department are the services of a stenographer and the construction of a fire-proof vault for the preservation of its valuable records. The duties of the chief are the same as those of other city engineers. Statistics, showing the amounts of different kinds of pavement, area, etc., will be found in a table elsewhere. The surveying instruments used have been supplied by Young & Young, of Philadelphia; W. & L. E. Gurley, Troy, N. Y., and Heeler & Brightly, Philadelphia.

In the paving specifications the most important points are as follows: All pavements are laid upon a broken stone concrete foundation from four to six inches in thickness; the depth of foundation

directed by the engineer. The weight of the rammer is not less than seventy-five pounds, and the roller shall weigh not less than three tons. The joints, or spaces between the paving brick, are filled full with Murphy's patent grout filler, or a cement grouting composed of two parts of Portland cement and three parts of clean, sharp sand. The price for brick paving on a six-inch concrete foundation has varied from \$2.44½ in 1891, to \$1.70 per square yard in 1899 and 1900. The price for brick paving on a four-inch cement foundation is now \$1.50 per square yard.

The following different bricks are in use: Hallwood block, John Porter repressed brick; Hayden block, Canton repressed brick; Canton Iron Rock, Canton Metropolitan; East Clayton, Hocking



AN UNIMPROVED STREET IN SUBURBS



A GRAVELED STREET IN SUBURBS



MAIN STREET, LOOKING NORTH, PAVED WITH BRICK, 1892

block; Pyro Granite, Nelsonville block; Athens block, Buckeye block; Harris Paver, Wassall block.

THE LAYING OF ASPHALT BLOCK

For asphalt block paving, a cushion of clean sand, one inch in thickness, is laid on the concrete foundation. The blocks are laid as close and compact as possible with all joints broken by a lap of at least four inches. They are then covered with clean, fine sand, perfectly dry and screened through a sieve, or screen, having not less than twenty meshes to the inch. The blocks are then carefully rammed, or rolled, as the engineer may direct, until they reach a firm unyielding bed and present a uniform surface, with proper grade and crown. When the ramming or rolling is completed a sufficient amount of fine dry sand is spread over the surface and swept or raked into the joints. The price for asphalt block paving has varied from \$3.32 to \$3.28 per square yard.

GRANITE OR MEDINA STONE

For granite or medina block paving the cushion of sand laid on the concrete foundation is from two to three inches in thickness. The medina blocks are of the best quality of sand stone, not less than four nor more than six inches in thickness; not less than six nor more than seven inches in depth, and from seven to twelve inches in length. They are dressed smooth on ends and sides, so that when laid in place, tight together, the joints will not exceed one-half inch in thickness. The bottom is square and parallel with the face, and the latter dressed true and smooth. The blocks are set in rows of uniform thickness, and must break joints with a lap of not less than three inches. After a thorough ramming, the joints are filled with sand to within five inches from the top surface and then completely filled with Murphy's patent grout filler, or a cement grouting composed of one part of Portland cement and two parts of clean sand. The price for granite paving has been \$3.73 per square yard and first-class medina stone has cost from \$3.73 to \$3.36 $\frac{1}{4}$ per square yard.

SPECIFICATIONS FOR ASPHALT

In the last asphalt specifications it was required that the pavement mixture, or wearing surface, should be composed of asphaltic cement, clean selected sand and pulverized carbonate of lime, combined and carefully mixed in such proportions that the most perfect and durable pavement, resulting from the use of such materials, would be produced. The asphalt is laid on the concrete foundation in two coats; the first of which is called the cushion coat, which is one-half inch in thickness after being rolled. The second coat is called the surface coat, and is one and one-half to two inches in thickness after being rolled, the thickness being governed by the amount of traffic on the street.

STREET PAVEMENTS

	Miles of streets paved with				Total miles streets	
	Granite and Belgian blocks.	Bricks.	Asphalt blocks.	Macadam.	Paved.	Un-paved.
Albany, N. Y.	30.41	16.97	9.33	3.12	80.92	53.00
Cambridge, Mass.	5.71	.70		40.65	121.00	
Portland, Ore.	4.16	.79	3.13	42.80	115.03	77.73
Atlanta, Ga.	52.00	2.00	2.00	3.00	63.00	137.00
Grand Rapids, Mich.		4.66	6.64	4.94	162.32	121.48
Dayton, O.	1.58	12.16	17.42		175.68	39.80
Richmond, Va.	24.00	.10	.30	6.50	87.90	28.30
Nashville, Tenn.	3.64	2.34		184.65	192.03	82.97
Seattle, Wash.	.57	1.45		.65	14.14	92.06
Hartford, Conn.	.75		8.48	76.08	85.13	30.17
Reading, Pa.	10.79	.25	5.25	51.75	72.00	63.00

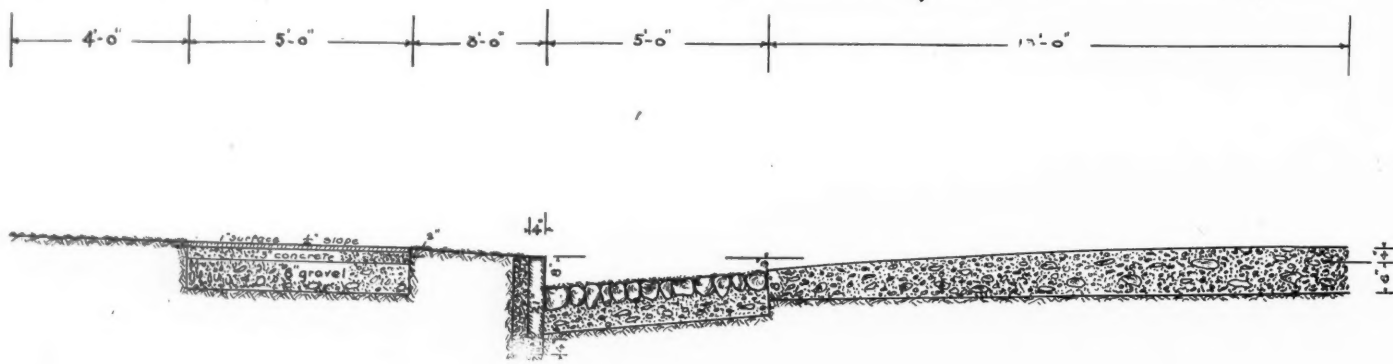
From 1891 to 1895 the asphalt specifications admitted only the asphalt from the Pitch lake on the Island of Trinidad. In 1895, Bermudez asphalt was added to the specifications, and at the present time the specifications admit asphalt from a number of different places. It may be that which is mined from the Island of Trinidad, or from the Bermudez Lake, State of Bermudez, Venezuela, or from the mines of the Alcatraz Company in Santa Barbara County, California, or Standard California asphalt, from Asphalto, Cal., or Sicilian rock asphalt.

Although the specifications have admitted these different kinds of asphalt, there has never been any bid for asphalt other than the Trinidad Lake. Notwithstanding this fact as soon as Bermudez Lake asphalt was admitted the price of paving decreased from \$2.68 per square yard in 1895, to \$2.32 per square yard in 1896. The last asphalt paving was laid in 1899, and cost \$2.21 per square yard for the Standard pavement, which has a six-inch concrete foundation and a two and one-half inch asphalt surface. The light standard pavement which was bid at \$2.07 per square yard, has a four-inch concrete foundation and a two-inch asphalt surface.

All pavements up to and including 1898 were put down under a five-year guarantee, which consisted of a bond of not less than 15 per cent. of the amount of the original contract. In 1899 the guarantee was changed to ten-years, and in addition to the 15 per cent. bond, there is retained 10 per cent. of the entire cost of the improvement for a period of ten years from the date of the acceptance of the work. After a term of six months from the date of the acceptance of the work, and if the contractor has complied with all requirements by keeping the street in good repair, he receives interest at the rate of 4 per cent. per annum on the said amount retained.

AN IMPORTANT REGULATION

After a street has been paved it cannot be cut into until there is first obtained from the City Civil Engineer a permit, and this is not issued until the applicant has signed the following agreement:



CROSS SECTION OF 60-FOOT STREET, SHOWING GRAVELED ROADWAY, BOULDERED GUTTER AND CEMENT SIDEWALK

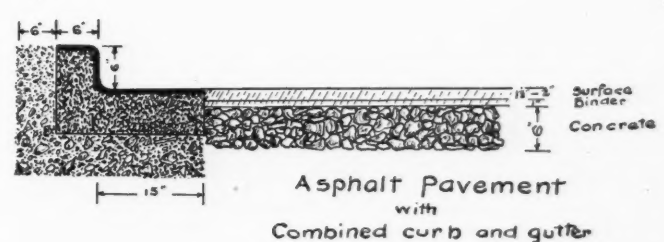
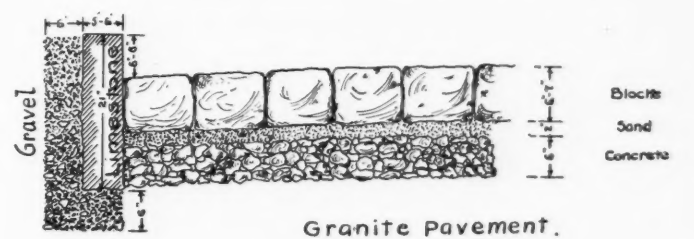
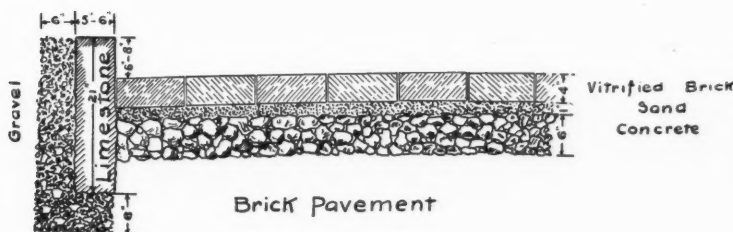
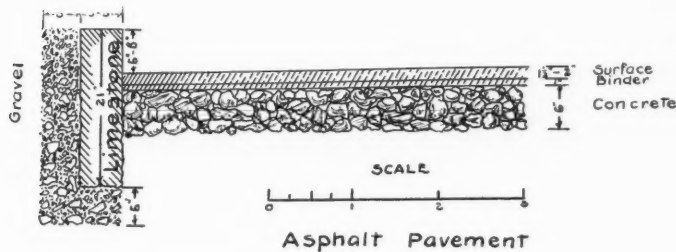
"In consideration of the consent given me this day by.....190..
for the City of Dayton, to open the pavement on.....Street,
opposite house No....., between.....Street and
.....Street, for the purpose of.....
.....I hereby agree to pay to the Superintendent
of Streets of the City of Dayton in charge of paved streets, within two days
after the work is completed, the cost of opening such pavement, which shall in-
clude the cost of excavating and removing any material, and the refilling of the
entire trench with clean gravel, and for the flushing of the same with water,
to the bottom of the concrete under the pavement, together with the price of
the permit for such opening, and I further agree to pay to the said Company
for repairing the paving at said opening at the rate of \$.....per square
yard, within ten days after the completion of said repairs."

Every city should have such a regulation.

After the contractor's guarantee on the street has expired, all re-
pairing is done by the street superintendent. In this manner good
repairing is insured, and the method has given entire satisfaction.

THE VALUE OF DIFFERENT PAVEMENTS

"As regards a comparison of the different kinds of paving," re-
marked Mr. Turner, "the Medina stone and granite paving has
proven itself to be the most durable and at the same time more
costly than any of the others. The Medina stone is preferable to the
granite, for the reason that it wears more smoothly on the top sur-
face, and is not as liable to cause slipping. The best conditions have



been obtained with the Medina stone when the joints are filled with
cement grouting.

PROPERTY VALUATION AND TAX RATE

	Assessed valuation of property.			Tax rate per \$1,000		
	Real.	Personal.	State.	County.	City.	Total.
Albany, N. Y.	\$59,133,540	\$9,874,344	\$1.96	\$5.50	\$13.94	\$21.40
Cambridge, Mass.	76,600,700	17,865,230	.51	.93	14.70	16.90
Portland, Ore.	23,267,754	6,286,455	11.30	8.40	8.00	36.00
Atlanta, Ga.	40,872,138	12,305,579	3.20	3.70	12.50	21.40
Grand Rapids, Mich..	27,788,950	15,475,071	2.20	1.42	10.07	20.42
Dayton, O.	31,744,890	10,757,180	2.90	4.08	11.27	26.60
Richmond, Va.	46,152,745	26,098,720	4.00		14.00	18.00
Nashville, Tenn.	29,513,426	8,443,700	3.50	2.50	15.00	24.50
Seattle, Wash.	33,640,526	6,507,739	6.48	5.52	8.00	25.50
Hartford, Conn.	49,613,997	20,146,633			† 16.50	† 17.50
Reading, Pa.	*	*		2.50	8.00	† 14.50

* Not reported. † Agricultural rate, \$6; not including school district tax
rate, from \$1.75 to \$5. ‡ Not including State tax of \$4 on mortgages, etc.
Legal basis of assessment is 100 per cent. of full value on real and personal
in all cities. The basis in practice per cent. of full value is 100, except in Port-
land, where it is 25 on real and personal, Dayton, 65; Nashville, 80, and Seattle,
60. In Atlanta, the rate on real is 66 2/3 and on personal, 100.

DEBT, ASSESSED VALUATION AND EXPENDITURES PER CAPITA

	Net debt.	Assessed valuation, real and personal property.	Police.	Fire.	Schools.	Total.
Albany, N. Y.	\$33.05	\$732.95	\$1.73	\$1.45	\$3.28	\$14.58
Cambridge, Mass.	66.29	1,028.08	1.35	.98	5.06	23.57
Portland, Ore.	62.28	326.83	.62	.88	2.71	11.83
Atlanta, Ga.	30.76	591.71	1.58	1.23	1.68	11.61
Grand Rapids, Mich.	21.58	494.08	.99	1.26	3.14	11.15
Dayton, O.	37.37	498.07	1.70	.91	3.45	10.56
Richmond, Va.	78.77	849.52	1.26	1.08	1.54	14.43
Nashville, Tenn.	41.17	469.39	1.11	1.02	2.07	9.98
Seattle, Wash.	67.07	497.68	.96	1.16	2.78	14.60
Hartford, Conn.	45.61	873.65	1.65	1.51	4.04	16.68
Reading, Pa.	17.01	562.23	.80	.55	2.40	8.49

DEBT AND SINKING FUND

	Debt.	Sinking fund.	Net debt.	Legal borrowing limit, per cent.
	Bonded.	Floating.		
Albany, N. Y.	\$4,608,850		\$1,496,702	† \$3,112,148 a 10
Cambridge, Mass.	7,916,500		1,825,793	6,090,707 b 2 1/2
Portland, Ore.	5,608,833	\$25,509	2,794	5,631,548 c
Atlanta, Ga.	2,927,500		163,354	2,764,146 a 7
Grand Rapids, Mich.	2,041,000		151,176	1,889,824 d
Dayton, O.	3,622,500		474,025	3,188,475 e
Richmond, Va.	7,227,423		527,758	6,699,665 f 1
Nashville, Tenn.	3,339,600		10,038	3,329,562 h
Seattle, Wash.	5,268,850	141,905		5,410,755 g 1 1/2
Hartford, Conn.	3,830,000	327,974	516,003	3,641,971 c
Reading, Pa.	1,491,000		147,701	1,343,299 a 7

† Including \$588,000 certificates of indebtedness against private property.
a Of assessed valuation. b Same, valuation for three years. c Controlled by
legislation. d Controlled by popular vote. e Assessed valuation of real estate.
g Assessed valuation; 5 per cent. by three-fifths vote, 5 per cent. for water-
works and lighting plants. h No limit.

"The streets paved with brick, excepting a very few, have shown
but little wear. Where repairing was done it has been due largely
to faulty construction and settlement of trenches. Where the joints
between the bricks have been filled with a cement grout the sur-
face is almost as smooth as an asphalt pavement, and it is much
smoother and more durable than where tar pitch has been used as a
filler.

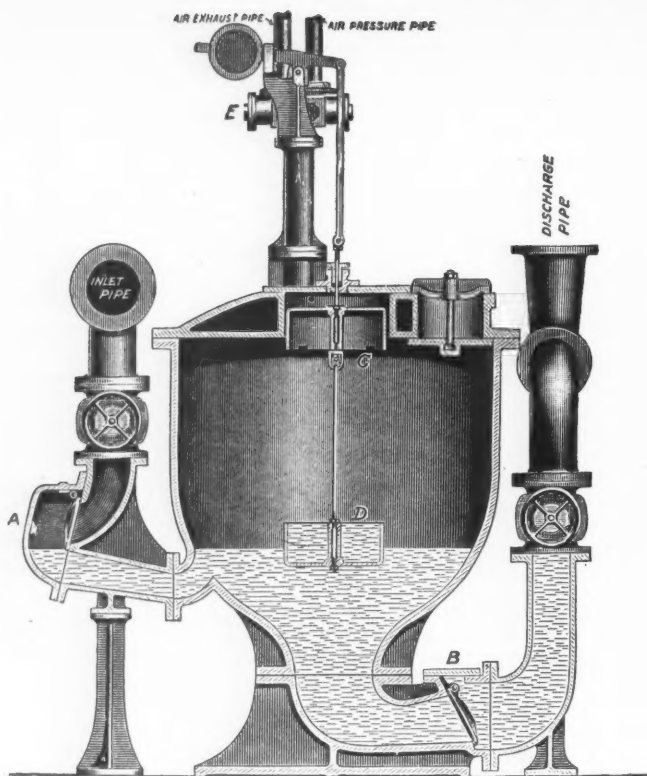
"Asphalt block makes a very smooth pavement; it is not noisy and
is less liable to cause slipping than either brick or sheet asphalt.

However, it does not fulfill the conditions on narrow streets, or on
streets where there is a street railway. The main objection to as-
phalt block in this city has been its cost. Sheet asphalt paving, ex-
cepting on several streets with heavy traffic, has given good satisfac-
tion, and has required but little repairing. The repairs made have
been largely due to water standing in depressions of the roadway
and in gutters. On the several streets having a heavy traffic the as-
phalt has been worn badly and required a large amount of repairing.

"When business streets, or those with heavy traffic, are paved
with asphalt, the gutters should be made of stone flagging or paved
with brick. Residence streets should have a combined cement curb
and gutter."

All of the asphalt paving in this city has been laid with a one-
half inch cushion coat and a 1 1/2-inch or two-inch surface coat. In
the future it is expected that a one-inch binder course, instead of
the half-inch cushion coat, will be used; the surface coat of 1 1/2-
inch or two-inch to remain the same.

There are 108 1/4 miles of graveled streets in the city, with either
cement or limestone curbing. The gravel is obtained from many
sources about the city, is of good quality and is laid on the subgrade
to an average depth of ten inches. There are 39.8 miles of unim-
proved streets. Illustrations of streets before and after improve-
ment with gravel will be found elsewhere. The city could improve
this class of streets to a great extent, and at comparatively slight
expense, by the use of its own road roller and stone crusher, em-
ploying day labor.



THE SHONE SEWAGE LIFT

The Sanitary Sewer System

The sanitary condition of Dayton is equal to the best in the country. The separate system of sewerage is used. It comprises 61.8 lineal miles with 2,560 connections at the present time. The sewerage is all carried to one point, south of the city, where it is discharged into the Great Miami river. The date is not far distant when the city will be required, by the State authorities, to purify its sewerage before permitting it to flow into the river. Such a system should be in use now.

The storm water sewers measure 66.4 miles in length, and are made up of pipe from ten to thirty inches and of brick from thirty to ninety inches in diameter. The sewer pipe is supplied by the American Sewer Pipe Company. The Miller flush tank is used and is a part of the system which could not be dispensed with.

One of the most interesting parts of this sewer system is that which has recently been installed in Riverdale, a suburb of Dayton, with a population of about 5,000. One-half of the territory was too low for the use of a gravity outlet by some 5.5 feet, to overcome which two Shone ejectors, made by the Shone Company, of Chicago, were installed, which solved the problem. The Shone system for raising sewage from a low level to a high level by means of a pneumatic ejector deserves special mention. In describing this system, Assistant Engineer Cellarius said:

THE SHONE SEWAGE LIFT

"This is an automatic appliance for pumping the sewage by compressed air. All the sewage from the low territory is conveyed by

gravity through ordinary sewer pipe to a point where two Shone pneumatic ejectors (duplicates) are placed in a cast-iron water-tight chamber twelve feet in diameter, which rests on a bed of concrete eight inches thick, and consists of thirty pieces of cast-iron circular parts bolted together by means of seven eight-inch bolts and then caulked with three-quarter inch extra strong lead pipe, making it perfectly water-tight. The bottom of the chamber is twenty feet below the surface of the ground, and the water would rise nine feet in the chamber if admitted. It is located at the intersection of the two streets, and has an ordinary two-foot iron man-hole cover on top, which is all that can be seen of it from the street.

"The power is derived from an air compressor actuated by steam placed in the Water Works Pumping Station, and conveyed by a four-inch cast-iron pipe a distance of 6,000 feet to the ejector. The only condition that would cause the ejectors to fail to operate would be the introduction of some hard substance, such as a lead pencil or small stick, and its being caught under the back pressure gate, in which case the air valve would remain open. The increased speed of the compressors would then indicate this trouble, which is easily remedied.

HOW THE APPARATUS WORKS

"The action of the apparatus is as follows: The sewage gravitates from the sewers through the inlet pipe A into the ejector, and gradually rises therein until it reaches the under side of the bell D. The air at atmospheric pressure inside this bell is then enclosed, and the sewage continuing to rise around it, its buoyancy is sufficient to lift it with the spindle, etc., and to open the compressed air admission valve E. The compressed air thus automatically admitted into the ejector presses on the surface of the sewage, driving the whole of the contents before it through the bell-mouthed opening at the bottom, and through the outlet pipe B into the high-level gravitation sewer. The sewage can only escape from the ejector by the outlet pipe, as the instant the air pressure is admitted upon the surface of the sewage the valve on the inlet pipe A falls on its seat and prevents the fluid escaping in that direction. The sewage passes out of the ejector until its level falls to such a point that the weight of the sewage retained in the cup C, which is no longer supported, is sufficient to pull down the bell and spindle, thereby reversing the compressed air admission valves, which first cuts off the supply of compressed air to the ejector and then allows the air within the ejector to exhaust down to atmospheric pressure. The outlet valve then falls on its seat, retaining the liquid in the sewage discharge main; and the sewage flows through the inlet once more, and so the action goes on as long as there is sewage to flow. The position of the cup and bell is so adjusted that the compressed air is not allowed to exhaust until the ejector is emptied down to the discharge level. Thus the ejector discharges a specific quantity each time it operates."

The air compressors, used in connection with the Shone ejector system, were constructed and installed by the Stillwell-Bierce and Smith-Vaile Company, of Dayton.

This city is destined, by natural advantages, to become of increasing commercial importance, and it is gratifying to note that with the continuance of the intelligent censorship of the daily press and concerted action on the part of public spirited citizens with the officials, the greater efficiency of the city government and the beauty of the municipality will be assured.



THE FIRST HOUSE BUILT IN DAYTON IN 1796, AS IT NOW APPEARS

BITUMINOUS MACADAM PAVEMENTS

The Principles Involved—The New Pavement Laid in Seven Cities the Past Season—Large Contracts Secured for 1902—Has Characteristics of an Ideal Pavement

By Fred J. Warren

THE name conveys an impression of what the pavement is, yet is a misnomer. It might properly be called a bituminous concrete, yet it is combined on different theories from what is known as asphalt concrete or tar concrete or tar macadam. It is more properly a concrete wearing surface than other bituminous mixtures in general use and is built more on the principles of hydraulic concrete.

The pavement in view, in the introduction of the name, "Bituminous Macadam," is one built on entirely new theories, or more properly, a new combination of those established facts and conditions which have been developed from the various uses to which bitumen has been subjected in over twenty centuries of use, and combining with this experience the durable qualities of stone.

It is well known that all bituminous pavement wearing surfaces are in fact artificial stone surfaces—the bitumen or asphalt being used to bind particles of stone or sand together. By far the greater bulk of the surface of the ordinary asphalt pavement is sand, and the names "asphalt pavement," "tar pavement" or "bituminous pavement" are misnomers, and simply convey in a very general way the nature of the cementing vehicle.

Each one of these cements may be subdivided into a thousand or more subdivisions, and the quality and physical properties can be measured and determined by chemical and physical tests. While much headway has been made in recent years toward perfection of methods of testing and examining the bituminous cements and mixtures, there is hardly a subject of such importance to engineers about which so little is known and recorded.

THE PRINCIPLES INVOLVED

The principle on which the bituminous macadam pavement wearing surface is combined, is the reverse of the principles on which the ordinary asphalt pavement is built. In the present asphalt or tar pavement the bituminous cement is used to support fine mineral grains, such as sand, which in themselves have no firmness to sustain traffic, in such a way that the fine mineral grains will be held or supported by the bituminous cement so that the mortar or mastic will, at all atmospheric temperatures, sustain the weight of traffic, and, at the same time, resist abrasion.

The bituminous macadam is built on the principle that, independent of the bituminous cement, relatively coarse and fine mineral grains should be combined in such a way as to have a firmness in themselves to sustain the weight of traffic. The bituminous cement is supported, or held in place, by the proper arrangement of stone particles as to size. The bituminous cement is used solely for the purpose of preventing attack on the stone from water and weather, and to bind the particles together sufficiently to prevent abrasion from traffic at all atmospheric temperatures and, at the same time, provide an elastic bituminous cement or cushion between the mineral particles which will deaden the jar and prevent the wearing effect caused by the friction from the movement of its integral parts.

The life or efficiency of either pavement depends largely upon the skill and care with which the various elements of the wearing surface are selected and combined, but I believe it is possible to select and combine the elements on the principles of my theory, or as practiced in the bituminous macadam pavement, so that the pavement will have several times more life than when constructed on the asphalt theory, and I feel much more certain that over 95 per cent. of the causes of failure can be overcome by the adoption of the bituminous macadam principle. I will undertake to give what seems to me to be absolutely proven reasons for this opinion.*

EDITOR'S NOTE.—This is the substance of an address delivered by Mr. Fred J. Warren, before the Boston Society of Civil Engineers, January 8, 1902.

It is a fairly well known fact that bitumens of certain grades have been known to remain plastic and intact for more than twenty centuries, as in the walls of Babylon and the Tower of Babel. It would be impossible except in a dense mixture. It is also a fact, but not so generally known, that so long as a bitumen remains plastic there is no perceptible wear from abrasion, and that the wear of a bitumen can only take place from its becoming hard and, passing beyond a plastic state at low atmospheric temperatures, when it becomes brittle, and will crumble. Some forms of bitumen may also lose their viscosity and their plastic nature and ductility, by the chemical action of water acting on soluble salts contained in it. In a liquid state bitumen will have little or no plastic properties.

The pavement being described under the name of bituminous macadam is a patented combination of bitumen and mineral particles. It is being laid at a less price than asphalt or brick in New England. Its actual cost of construction is not materially different from the actual cost of constructing an asphalt pavement, but the price to cities is much lower on account of the commercial policy of those controlling its introduction.

COMPETES WITH ANY OTHER PAVEMENT LAID

The pavement has been laid in Pawtucket, R. I.; Holyoke, New Bedford, Cambridge, Lowell and Brockton, Mass.; Salem, N. J., and Charleston, S. C. It enters into competition with every other form of pavement. It has already been ordered on ten miles of streets in various sections of this country and Canada, for work to be done next year, and is now being considered on miles of streets in all sections of the country from the Pacific to the Atlantic.

Before it was actually laid, the only undeveloped theory entering into the construction was, "Can coarse particles of stone when used near the surface of a bituminous pavement be held in place so they will not chip out under traffic?" The most trying time to test this question is when the surface is new and has not had the advantage of compression by traffic. In no case has any individual stone slipped out of the surface in any of the seven cities where it has been used.

The areas laid in each of the cities are small, as measured by miles, but are sufficient to demonstrate the fact that the body remains intact under traffic; all other principles incorporated in the pavement are those which have been demonstrated to give the greatest possible life to a bituminous cement, and are simply the adoption of well established principles which could not be practiced in the ordinary asphalt pavement, because of the nature of a surface made of sand and asphalt. It is believed by many engineers who have the qualifications and experience to give their judgment great weight and who have looked carefully into the principles involved, that its natural development will give a pavement with much more life than any other form of bituminous pavement yet devised.

The ordinary method employed in its construction is to assume that a natural foundation thoroughly rolled with a heavy road roller, furnishes a solid sub-base; that a solid base of four inches, of two-

* Attention should be called to the fact that so called "tar macadam" is built on the principles of the ordinary tar concrete, with the exception that stone is used instead of gravel for the foundation, and only about the same quantity of surface mixture is used as in the ordinary tar sidewalk. An effort is made to force the surface into the foundation by rolling with a heavy roller. It is an imperfect method of accomplishing a result. Its efficiency is largely determined by the extent that the surface mixture is forced into the base, and the life is also largely determined, as are all other bituminous pavements, on the proper selection of the elements making the surface. I do not see that the pavement offers any advantage or is any different in principle or wearing properties, over what is known as tar concrete, except that a heavier roller is used in the compression. The "tar macadam" process does not overcome the principal causes of initial failure.

inch to two and one-half-inch stone will, after thorough compression with a fifteen to twenty ton roller, provide an ideal foundation for a waterproof surface, and will provide drainage to moisture accumulating from the surrounding ground. If more drainage is necessary, drains rather than extra foundations are advisable. The stone is better if very hard, but this is not so important in the foundation as in the top.*

Such a foundation offers many advantages over hydraulic concrete, in that the overlying courses enter and bind into the foundation, and the foundation aids in holding the top or wearing surface in place.†

On top of the stone foundation is spread, or sprinkled, a coating of specially prepared thin bituminous cement which enters the minute crevices of the surface of the stone and permits the stone in the foundation being firmly held together with the waterproof cement which is afterwards freely used over the surface of the foundation. This waterproof cement is thus enabled to grip onto the stone permanently and, being of a hard pitchy nature of a grade of flexibility that will bind the surface of the foundation firmly in place, it makes the foundation itself rigid before the wearing surface is rolled in.

On top of the foundation thus prepared is spread a layer of the wearing mixture which should have a thickness of about two inches after its maximum compression. This mixture is a carefully prepared combination of one-inch and two-inch stone, having voids filled with receding sizes to a dust or powder of stone. Some sand may be used to aid in filling voids when necessary.‡

METHODS OF PREPARATION

The mineral or stone part is dried and heated in a modern dryer and is then separated by screening with rotary screen into its sizes varying from fine dust, which is less than 1/200 of an inch in diameter, to the largest size used. The several sizes of stone are then mixed in predetermined proportions, so as to reduce the voids to about 10 per cent., in a modern "twin pug" steam power mixer, and the hot bituminous cement is added in the mixer in sufficient quantity to not only coat every particle and fill all of the remaining voids, but with enough surplus to furnish to the mixture after compression, a rubbery and slightly flexible condition.

The mixer makes seventy-five revolutions per minute, and every particle of mineral is coated in about fifteen seconds, but the mixing is continued about two minutes to provide absolute uniformity of distribution of bitumen and mineral. The whole is dumped by gravity into wagons and hauled to the street where it is spread in the same manner as an asphalt pavement. It is then rolled with a fifteen to twenty ton road roller, which gives many times as much compression to the inch run as the ordinary asphalt roller.

After a thorough and continuous rolling there is a little honey-combed appearance to the surface where coated particles of stone come together, but the body of the mixture on being broken shows denser under the magnifying glass than any bituminous wearing surface that has heretofore been used.

Good rolling is an essential feature, as it assists to place the particles where they belong, and continued rolling forces out the minute air bubbles and forces the surplus bitumen into the fine voids, leaving

* In resurfacing macadam the surface should be roughened and, on resurfacing other forms of relatively smooth pavements, an intermediate or binder layer of coarse stone and hard bitumen should be used to hold the surface firmly in place.

† I would argue that it has been fully demonstrated through the experience of the practical use of millions of square yards of macadam roads and of a few miles of asphalt pavement, that a well rolled crushed stone foundation will stand the pressure of traffic. The two oldest asphalt pavements in this country are laid on this class of foundation, notwithstanding that, at the time of their laying, proper rolling as practiced to-day was not in vogue. The only function of the concrete foundation is to sustain the weight of the load, and its utility in this requirement cannot be questioned. It fails to aid in holding the wearing surface in place, as it presents a smooth surface, causing tendency of the wearing surface to shift. It fails to offer proper drainage under the pavement and, on the contrary, is a trap for moisture which is always an important factor in sub-surface construction. In an asphalt pavement the moisture thus held often is the cause of disintegration or rotting from the base upwards. It should only be used in cases of very poor soil or other conditions affording a weak sub-foundation.

‡ The large stones for use in the wearing surface, as well as the fine stone in receding sizes, should be from a sound hard rock and one which is least subject to wear by abrasion. Of course the locality, quality, condition of traffic and cost, will be controlling features in the selection.

the body of the surface so dense that it cannot be rutted or displaced by traffic. It also adds to the life of the bituminous cement by protecting it from the action of exposure to the elements in minute semi-detached particles. The rolling should commence as soon as the surface is spread, and it is advisable that one heavy roller should not be required to do more than 1,000 square yards of surface per day.*

The tanks or heaters used to heat all grades of bituminous cements should be so arranged as to easily control the heat, as overheating and the consequent change in the physical qualities of the bitumen are frequently the cause of initial poor work in all forms of bituminous pavements.

Great care should be exercised in heating the stone or mineral parts, as overheating the stone will cause rapid change in the softness or ductility of bituminous cement, each particle of stone being coated with a layer of less than 1/500 of an inch in thickness; the effect of high heats in this condition of exposure is very rapid on the cement.

This condition is not so important as in the asphalt pavement, as the coating of the cement is heavier, and it is used in a softer form and therefore has more life to lose, before it becomes inefficient. It is nevertheless important, for the cement is prepared with an allowance made for the normal change in making the pavement, and if the change is abnormal, the physical differences may affect the life of the work.†

On top of the surface thus made, partly to heal and seal the surface from attack, and partly to hold and help make a practical wearing surface, there is poured and rubbed into it all of the quick drying bituminous cement that it will take. This leaves the surface as sticky as if freshly painted.

On this surface is spread a coat of fine stone chips which adhere to the bitumen on the bottom and present a rough, gritty surface to travel. The rolling of these rough chips into the surface has the effect of putting the pavement under greater pressure, and forces as much stone into the surface as it can possibly receive, thus making it more gritty and suitable for travel.

GIVES AN IDEAL ROAD SURFACE

The above method gives an ideal road surface, and with traffic and wear it will always maintain a large part of the roughness of a perfect macadam road as compared with the smoother and polished surface of the asphalt. It is relatively as smooth as asphalt, yet the coarse particles of the surface hold moisture and dust longer, and the pavement will always be less slippery, less dusty, and can be made more durable than any bituminous pavement previously laid. Under considerable traffic, I believe, it is as durable as a block stone pavement made of the same stone. While the coarse stone in the pavements prevents cutting up under traffic in summer which asphalt pavements frequently do, yet the increased flexibility of the bitumen and the larger amount used, as compared with the voids to be filled, provides a surface more elastic and not as hard on horses, while fully as pleasing for pleasure driving.

The click from the horses' hoofs is much reduced as compared with asphalt, and the pavement is one of the most noiseless in use. This is especially noticeable in cold weather, when all bituminous pavements are the hardest and most resonant.

From the practical standpoint of an engineer, it can readily be seen that the rigid stone particles permit of: a, The reduction of voids; b, The use of a softer bituminous cement; c, A heavier coating of cement around each grain.

Each of these self-evident condition will, in themselves, more than double the life and service of the bitumen itself. If the pavement fails it will be from other causes than the common reasons for failure of asphalt pavements as at present constructed, but might be from such causes as the following: a, The crushing or grinding of a

* The quick chilling of a bituminous cement causes inevitable lack of compression, and is the only reason why it is inadvisable to lay asphalt or bituminous pavement wearing surfaces in the coldest weather in winter.

† The safest way to regulate the temperature of the stone or mineral parts is to heat it in a rotary dryer, and while the dryer is running, maintain a constant feed to its full capacity, having the fire box of such size that a fire sufficient to overheat cannot be maintained. It is very practical to overcome all the possible causes of failure, but it requires experience to detect the causes and care to overcome them.

poor quality of stone under traffic; b, Carelessness in not properly placing the various sized elements of stone; c, Improper equipment and supervision induced by inconsistent economy.

The selection and method of preparation of bituminous cement used has naturally great relation to the life of any pavement. Bitumen, as is well known, passes by almost insensible degrees from liquid to solid form, and may be tempered to any consistency. The softer the temper of any given quality of bitumen, the longer its life under any given amount of exposure. The softer the temper of the cement, the lower the melting point and the greater its flexibility at any temperature lower than its melting point. The length of time any given grade of bitumen will remain flexible and fill its office depends largely if not wholly upon the kind and conditions of exposure.*

With natural hard bitumens or pitches, the process is to "cut back" the natural material with oil of various classes, to produce the softness desired. With natural soft bitumen the process is to extract a part of the natural softening oil.†

ESSENTIAL CONDITIONS

In order to maintain uniformity and enable one to improve and perfect any bituminous pavement, it is quite essential to have recourse to a chemical and physical testing laboratory, and to record all conditions present. Such a laboratory should not only examine materials to be used, which examination justifies an opinion of their combination or use, but, after a mixture or combination has been determined upon a sample should be taken daily, or at frequent intervals, and it should be separated into its parts and the actual conditions present in the mixture, as it is actually laid, should be carefully recorded, and the exact location where the particular sample is taken, should be noted.

This record acts in affecting the pavement in important ways. It gives a sure test of whether instructions are being followed, and makes every employee careful, for carelessness will surely be detected under this system.

It also provides a record of the exact conditions present, as the pavement mixture is actually laid, as against and to be compared with, the record of the exact kind and quality of the commercial materials directed to be used. This system has made it possible to lay fairly good bituminous pavements out of relatively poor bituminous cement, and under principles which have proven deficient. The record is an invaluable aid in measuring the change in the physical condition of the wearing surface, and the bitumen itself under exposure to weather.

It is far easier and more practical to measure the changes that take place by physical than by chemical tests. It becomes important, however, to know the nature of the bitumen and so use it as to prevent the changes from taking place.

The bitumens vary a great deal in their crude state in many different and varying physical and chemical properties. The essential chemical differences that can be detected are varied proportions of oxygen, hydrogen and carbon. The presence of varying quantities of non-bituminous substances such as free carbon, sand, clay, loam, vegetable matter, lime, soluble salts, acids, sulphur, etc., can be detected by analysis and may indicate the danger encountered in its use. The relation of the atoms of oxygen, hydrogen and carbon to each other, as it effects the physical condition of the bitumen, has never been definitely determined. It is known, however, that the process of hardening is the liberating of a larger part of the hydro-

* It does not depend upon traffic, as is generally supposed, except that in imperfect mixtures containing many voids, a certain amount of traffic is essential to keep an enamel on the surface, which alone protects the bitumen in the body from attack in such minute sections that failure would otherwise occur much easier. With certain forms of bitumen which in their natural state contain soluble salts, the pavement if it is kept wet, cannot provide the enamel and the traffic which on a dry pavement would add to its life, simply acts to rub off the disintegrating surface and causes its early destruction.

† All other things being equal, the process of cutting back the bitumen injures its physical quality. With some forms of bitumen, however, it may be advisable to substitute a good permanent oil or softening flux, for an inferior oil present in nature. The general practice in "cut back" cements is to remove an oil of great value commercially, and of value to the cement, and substitute an inferior oil of little commercial value. It is seldom that it occurs that any crude bitumen, as it is found in nature, is in the best state of flexibility for use for any purpose. It is sometimes used in its crude commercial state, but it is generally deficient in some one or more essential properties.

gen atoms than of the oxygen atoms, or the taking up of oxygen from the air, which in itself brings about a rearrangement of the atoms and a consequent change in the physical properties of the cement or bitumen itself.

The physical condition does not change except on exposure to the elements, and as stated, the life and stability of a given bitumen depends entirely on the quantity of atoms exposed and on the extent of the exposure. In solid bulk in nature the change is so slow as to take centuries or ages to change a soft bitumen to a hard one, and the presence of oils are often indicated by the outcropping of asphalt or tar in the surface.

The important physical tests as applied to bitumen are relative only. The important tests are: a, for flexibility; b, for viscosity; c, for brittleness; d, for ductility; e, for adhesiveness; f, for range of temperature between its liquid and brittle point; g, for aging effect of a given amount of exposure; h, for amount of volatile oils; i, for effect of water on exposure.

It is of course necessary to make the tests under exactly similar conditions in order to have them of any value. An intelligent consideration of such physical examinations are a fair index to the value of the bitumen, but one must have learned by experience the effect of the varying conditions in order to accurately judge of their relative importance, and in order to apply the information to a pavement in practice, it is necessary to correctly arrange for its use with the mineral or non-bituminous matter.

It enables one to estimate with a reasonable accuracy the probable life of a bituminous pavement under the particular conditions present on the particular street where it is used.

THE RESULTS OF TESTS

The estimation of life should, of course, be considered in connection with tests made on the crude material used, on the cement itself, and the completed pavement wearing surface, and can only be considered in connection with a large volume of tests made on pavements at various stages of their life. The results of such tests mean nothing to anyone who has not in practice become familiar with the detailed conditions present in a large quantity of good, medium and defective work.

The consideration of a very large volume of such information led to the adoption of the principles of the bituminous macadam, in the effort to overcome all of the weak points of the asphalt pavement. Whatever opinion may be held of the efficiency of the completed roadway there can be no possible question but that in it 95 per cent. of the causes of complete or partial failures in asphalt pavements have been overcome.

If new causes of failure not now appreciated are to be encountered, they have not yet come to light, and on every known theory or principle that can be applied to the subject, the pavement is already established as to its value from both a scientific and a practical standpoint. The records maintained will aid greatly in overcoming any possible defects, and enable the incorporation of improvements from time to time in the grading and adjusting of sizes of particles and will suggest improvements in methods not known or in vogue in bituminous pavement construction.

There are no established methods of testing bituminous cements or mixtures, which are generally available and recognized by engineers. Unless the engineer has had practical and extended experience in the manufacture, use and testing of bituminous materials, his only safe method of getting good work is to specify what is wanted in such detail that, in some direct or indirect way it carries with it the use of one or more good and established materials as used by an experienced party or parties.

It is unfortunately true that the experts are few and far between and that the amount of fair competition which is desirable to the engineer in bituminous materials or work, is often difficult to obtain. This is largely due to the fact that the business has been developed in secrecy by interested parties who are generally manufacturers or contractors and have frequently never themselves studied the scientific reasons, and whose sole success depends on having, on practical experiment and use, happened to strike a combination or mixture which gives greater success than the mixture of some competitor. Under these conditions the engineer is often led to believe that "white is black and black is white," and he often attributes the

success to the quality of the material used when it is properly attributable to the method of its use or the intelligence and experience of the user or manufacturer. It is safe to say that almost every initial failure in the use of any bituminous material is due almost entirely to the method of use, for hardly any crude bitumen is so poor that it cannot be made into a cement under proper treatment, so that it will appear for a time almost equal to the very best that could be produced. So sensitive are the bitumens to improper treatment that it often happens a relatively poor bitumen owing to more intelligent treatment will prove better in the completed work than the better grade used under more haphazard or unscientific methods.

COMMON ERRORS

It is the common practice among engineers and contractors to place too much importance on the particular variety of asphalt or bituminous cement to be used, and too little importance on the reputation and professional ability of the expert. This practice is partially justified from both the engineer's and contractor's standpoint because most every known grade of bituminous cement is an individual monopoly in itself and is sold by brand or name under the competitive system; the only possible way for the engineer to be sure to get an experienced contractor is to specify the materials he knows to be controlled by the experts doing business in his section, and the successful contractor in turn holds his business by the successful use and development of the material which he monopolizes.

The abuse of this practice sometimes leads the unscrupulous con-

tractor to trade on his reputation in other lines and abuse the confidence reposed in him by the engineer, and we often find materials specified for work which are vastly inferior to the best available, for a particular purpose, and which cost more money than the better material.

The power to refuse to award contracts at unreasonable prices can always be used with a contractor to keep him within reason as to price and to prevent combinations among contractors if two or more materials are specified. Combinations are often made among contractors to prevent unjust competition and maintain a fair price and, when forced, the city often pays a higher price or gets inferior work than when dealing with one contractor alone. The contractor's side of the matter if he happens to be one of experience and is trying to enter a new field is that some of the monopolies in the bituminous and paving lines are a national strength and of such tremendous magnitude that they will crush out a new competitor in an allied line if given an opportunity. So called competition then ceases to be competition but a "cut throat" policy to drive competitors to the wall and establish a monopoly.

To meet this condition, I think the engineer or official is on the highest moral grounds justified in paying a reasonable price to a legitimate contractor, rather than permit his annihilation and financial failure, or force him to combine with his competitors by forcing him through unreasonable competition into a position where they must combine or succumb.

STREET SIGNS AND FIXTURES

The Municipal Art Society Lends a Helping Hand—Artistic Points Considered—Character and Size of Letter—Demand for Better Signs in New York Insistent

PART II

By Nelson S. Spencer

ALL signs should be of such size and design as to be easily read by day and, so far as practicable, by night. This again involves the use of discretion in the executive official as to their placing, so that the light from street lamps shall fall on them at night. It is beyond reasonable doubt that an insistent demand will require in no distant time that they shall be illuminated; but, until illuminated, there should be such an association between the lighting of the streets and the placing of the signs that the one will always serve the other. It is not difficult to illuminate house signs in conjunction with electric street lighting by means of a reflector, which shall cast a strong light upon them from above as the destination signs on electric cars are now illuminated. Or a glass sign box upon the electric light pole itself may be illuminated from within.

SIZE AND CHARACTER OF LETTERING

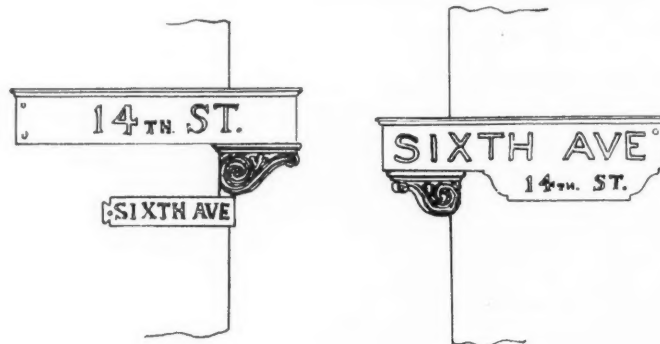
The statement need hardly be made that the letters should be of sufficient size to be read at some little distance. They need often to be read hurriedly, especially those to inform the passing traveller in the cars, and they must be, above all, distinct. In that respect the ordinary blue enamel sign can scarcely be improved upon.

Many suggestions have been made as to the character of the lettering. That also is a matter for executive discretion. In some parts of the city it may be of service to have the sign show both the name of the street designated and the cross street or, perhaps, as has been done at times, the nearest street number. The design for a sign to be affixed to corner buildings, which accompanies the text shows how this may be very well done without becoming confusing. But this is a matter which will be governed by convenience in various parts of the city and is not substantial.

But what a large city needs in this connection more than any other one thing is the institution of a general and comprehensive plan providing for the combination of all street fixtures. Such a plan would probably involve the erection of a structure as light as possible in construction, but capable of being closed and locked. The suggestion may, perhaps, best be understood from the accompanying plan and design. This shows at once how feasible it is to provide a

single and convenient structure for the hydrant, fire-alarm box, the police telegraph or telephone, the letter boxes, man-hole, and finally the street sign. By combining all these fixtures in one structure, the street would be very materially relieved, and the structure itself would be a substantial addition to the beauty of the street. If adopted, it would become unnecessary to place signs on the house corners, and the signs for the street cars could be most readily attached at the proper height.

It is, of course, apparent that the necessary readjustment of these various public utilities could not be made at once, that the process would involve some co-operation between various departments of the government, and some expense, but with a vigorous official at least a beginning could be made in the more thickly populated parts of the city, and in course of time the plan would be extended



throughout the city. It would be a most convenient and needed addition to the well-regulated organism of a city.

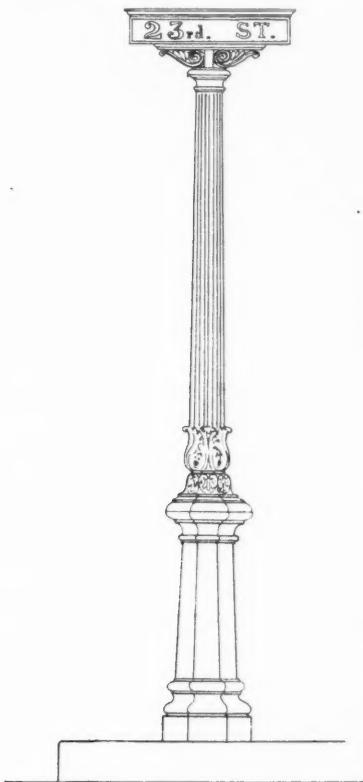
CONSIDERATION OF ARTISTIC POINTS

In the determination of the artistic value of the signs, executive discretion may properly be limited, though not by the legislative authority. It is manifest that different kinds of signs will be needed in different places. Executive choice, then, should lie between one of several. Designs for the different classes, or for particular in-

NOTE.—From the current issue of *Municipal Affairs*, by the permission of the Editor.

stances, should be approved by some body which corresponds to the Municipal Art Commission of the city of New York. If such a commission approve a number of different kinds of signs suitable for different parts of the city, the official could then exercise his choice among them as the case requires. The principal thing to be accomplished is that the simplest sign should not be ugly. On the other hand, it should have positive beauty, and if possible, great beauty. There is in this respect much room for the exercise of invention. Practically, of course, invention is governed by a limit of cost. But if the work be done gradually, the cost will readily be met without becoming a burden, and the addition to the city's beauty can easily be made exceedingly great.

By way of illustration some suggestions are shown in the accompanying designs, to which reference has already been made. They relate to signs to be attached to corner buildings, and structures designed for all the street utilities of the city. They were prepared as suggestions for the use of the Municipal Art Society in its con-



sideration of the question, and were not intended to be final. The society, indeed, considered a general competition most advisable, and offered to the Municipal Assembly of the City of New York, if it could be advised definitely of the requirements of the city and of a limit of cost, to conduct such a competition, at its own expense, and furnish the result for the adoption and use of the city. But before it could be advised of these requirements, it was necessary that they should be determined by some authority. This authority was necessarily administrative, but there was at the time no administrative authority who could be compelled to act. In order that action might be taken the society proposed to the municipal assembly an ordinance which would compel the adoption of some sign for every street, but with elastic provisions as to the character of the signs to be erected according to the varying needs of the locality. It would then be

possible to have consultations with and the executive decision of one man on the various details to be considered, with which it is impracticable for any large body to deal. As this proposed form of ordinance embodies the ideas already stated, it may properly be quoted in full:

NEW YORK'S PROPOSED ORDINANCE

An ordinance authorizing and regulating the designation of the names of streets, avenues and highways in the City of New York:

It is ordained by the Municipal Assembly of the City of New York, as follows:

Section 1. The name of each street in the City of New York shall be designated by a sign stating such name, placed substantially parallel with the direction of the street at each corner formed by its intersection with any other street, and the Commissioner of Highways is hereby authorized and directed to designate all streets accordingly.

Sec. 2. Such a designation shall be made as follows:

(a) If there be a building erected on the corner lot, by placing such signs on the intersecting street walls of such building, if the owner of such lot or building consent thereto.

(b) If there be no building erected on the corner lot, by signs placed on a suitable post erected at the street corner of the lot, if the owner of said lot consent thereto.

(c) If the owner of any corner lot or building do not consent to the use of his lot or building for such purpose, or, if in the opinion of the Commissioner of Highways, it is impracticable to use the building on such corner lot for such purpose, then on a suitable post, lamp-post, electric-light pole, or other standard, or structure, either existing or erected for the purpose, and situated at the intersection of the streets, provided, however, that in such case not more than two such corners need be so designated, which shall be diagonally opposite to each other.

Sec. 3. In addition to the designation prescribed in the foregoing sections, the Commissioner of Highways is hereby authorized to designate further the streets of the City as follows:

In each street in which is operated a street railway or other transportation line, or in which for other reasons he may deem it desirable, to place signs on a suitable post, lamp-post, electric-light pole or other standard or structure, either existing or erected for the purpose, and situated on diagonally opposite corners formed by the intersection of such street with any other street. Such signs shall indicate the name of the cross or intersecting street, and shall be placed at about an angle of forty-five degrees to the street, on which is operated such railway or other transportation line, so as to be legibly read by passengers in an approaching or passing car or other vehicle.

Sec. 4. All signs shall be of such size and be so placed, and of such design, as to be easily read by day, and, as far as practicable, by night. They may, by any suitable device, indicate both the street designated and the intersecting street, and the street number of the corner building. All designs for the signs shall be as few in number as may be consistent with the necessities of different portions of the city, and shall be of as artistic character as possible, having regard to their cost. Such designs shall be submitted by the Commissioner of Highways to, and be approved by, the Municipal Art Commission, but this shall not prevent the Commissioner of Highways, if necessary, from erecting temporary signs prior to such approval of the designs therefor.

If it be practicable for the Commissioner of Highways to combine the purposes of public utility other than advertising, for which any post, standard or structure may be used, he is hereby authorized to provide for such combination.

Sec. 5. The word "street" in this ordinance wherever used shall include any street, avenue, highway, road, court, or alley used as a public way.

Sec. 6. All ordinances or parts thereof inconsistent herewith are hereby repealed.

Sec. 7. This ordinance shall take effect immediately.

THE DEMAND FOR PROPER SIGNS INSISTENT

No action was taken on this ordinance. But now that the revised charter has specifically conferred authority in this matter upon the borough presidents, an ordinance has become of less importance. And in the meantime public opinion has become more and more aroused, and the demand for proper signs has become more insistent. Various specimen signs have been erected by individuals, associations of citizens, and by lighting corporations on certain street corners of the city, illustrations of two of which accompany the text. Both of these are box signs attached to electric light poles, which are illuminated at night from within. As part of the lighting system of the city, they would be presumably maintained by the lighting company at a fixed price for each sign, and in certain portions of the city they would be of excellent service. They are not, however, the final solution of the problem. The trolley car passenger must not be forgotten. In the end, the simplest sign will be found to be the best. This means that no combination which tries to satisfy at once opposite demands will be effectual. As a result of this agitation the city seems likely to receive some relief. The newly elected president of Manhattan borough has already announced his intention of giving the matter vigorous attention, and it is to be hoped that the presidents of the other boroughs will follow his example. It is the purpose of the Municipal Art Society to see, if possible, that the satisfaction of the needs of the city in this respect shall not be a makeshift, but shall be at once progressive and beautiful.

THE END

THE TWENTIETH CENTURY CITY

Will Be Governed by Trained Officials—Germany Teaches Valuable Lessons—Business Administrations No Better Than "Partisan"—Change to Better Things Involves a Revolution

By Richard T. Ely *

MUNICIPAL reform is a subject of universal import. There is no man, woman or child in the United States to whom it has not a deep significance. Not only is the dweller in the city concerned in municipal reform, but upon the salvation of the city depends in large degree the welfare of the woodsman in the pine forests of Minnesota and Wisconsin, and the frontiersman in the far West. On the other hands, the dwellers in cities must not vainly suppose that municipal well-being can be secured while the rural districts are neglected and impoverished. There is a social solidarity between city and country which has heretofore been inadequately appreciated.

CITY PROBLEM INVOLVES A REVOLUTION

The problem of the city is the problem of a revolution, a revolution brought about by a remarkable evolution. This country of ours has been shaped largely by men from the farm and the plantation. Significant it is that for the habitation of the nation we must use the word, the country, and say "This country of ours," whereas the Greek of classical times used the word city, for the State, and would say "This city of ours," meaning not only the city itself in the narrow sense, but the city with the rural districts surrounding it. With us the story of Cincinnatus has often been repeated. We are now, however, reaching a time when the destinies of the country will be controlled by the men of the city or by men brought up in essentially urban conditions.

When we began our national existence, approximately about one-thirtieth of our population lived in cities, and now about one-third. In 1880 there was only one city in the United States with a population of over a million; in 1890 there were three, and at the present moment, even not counting in the recent annexations to New York, we have two cities with approximately two millions each. But this movement to the cities is not something merely national, but something as wide as the extent of industrial civilization. It has been brought about not by changes in the feelings and desires of men, but by deep underlying economic causes. There is every reason to suppose that the forces which have brought us this urban growth will continue to operate for a long time, and that the twentieth century will witness a civilization largely urban in character.

MISCONCEPTION OF THE QUESTION

The general interest in municipal reform is something which is indeed quite warranted, but it is not even yet adequate. But more than this must be said; important aspects of municipal reform have been neglected. The familiar rallying cries heard in municipal campaigns indicate imperfect and insufficient ideas of the nature of municipal problems.

Perhaps the most familiar watchwords in the battle for municipal reform are those grouped about the business idea of the city. It is said that we want "a municipal administration on purely business principles;" also, "municipal government is business, not politics." Then as a corollary the demand is made that business men should be put in office; "business men," we are informed, "are the natural and inevitable directors of local affairs." And when the business idea is made dominant, retrenchment is usually coupled with reform. It is urged that an extravagant administration must be replaced by an economical one and the tax rate lowered.

Closely connected with the demand for business methods and business men in municipal government is the claim that there should be absolutely separation of municipal government from the politics of the state and the nation. Home rule for cities, as it is called, is also a familiar rallying cry.

Civil service reform is something so obviously needed in cities that it cannot be overlooked in any platform of municipal reform, but as further planks in such a platform we frequently find the statement that it is essential that administrative power should be concentrated in the hands of the mayor, and sometimes the demand that he should

hold office for one term only. Finally the failure of the so-called best citizens to take part in politics is invariably deplored, and they are entreated to arouse themselves and to save the city.

It is easy to recall many past campaigns in which the hosts of reform have by such rallying cries been gathered together to do battle for the salvation of the city. One of the earliest great municipal campaigns which we recall is the one in New York which overthrew the Tweed regime, and it was thought "downed" Tammany. Then later, followed some fifteen years ago, the Hewitt campaign, when the business idea triumphed. Then in 1894, Dr. Parkhurst's "Triumph of reform," when Tammany was again overthrown.

Some twelve or thirteen years ago when the so-called Bullitt Bill was passed by the Pennsylvania Legislature, and a business man was elected mayor, it was said that at last a permanent reform had been achieved, and the good citizens of that city rejoiced in what had been accomplished. I also well recall the triumph of the business men with the business idea in Baltimore while I lived there, as well as the disappointment and reaction which returned to office the politicians.

A CONSTRUCTIVE PROGRAM NEEDED

But why say all this? It is not said out of lack of sympathy with the efforts which have been made in the past to achieve municipal reform, but because we in the twentieth century are feeling that we need a wider, deeper basis for reform, if it is to bring us what we desire and to prove a permanent acquisition. We feel that in the latter part of the nineteenth century we were not led to full and lasting success, and we are opening the twentieth century with a demand for a positive, constructive program.

It is well for us to turn our attention to those countries in which the greatest success has been achieved in municipal government, namely, Germany and England. And let me say right here that we must overcome our prejudice against European experience and European methods. Modern industrial civilization is very much alike in all the great nations of the world, and each country must learn from all the others. We Americans are a very great and a very wise people, but the Almighty has not concentrated all his gifts upon us. It is time that we heard the last of the "effete monarchies" of Europe! Naturally we cannot adopt without change or modification what we find in other countries, but no one suggests that. We must study foreign methods where they are better than our own, and learn from them lessons which we can apply in our own way to our own conditions. This is especially applicable to municipal reform, because in public administration, we, in this country, have not shown ourselves peculiarly gifted, whereas the achievements along this line in Germany and England must be placed at least on a par with our achievements in constitutional methods.

HOW A GERMAN CITY SELECTS ITS MAYOR

I have before me the advertisement of a German city for a mayor. It is stated in this advertisement what the salary is, and what the qualifications required are, and these are very high. It is added that in case the mayor is not reappointed after the expiration of his first term, he shall be entitled to a pension equal to his salary, and finally, all candidates, wherever they may live, are requested to send in their applications to the chairman of the municipal council before a certain date.

Let us consider for a moment the contrast suggested. First, municipal government is a profession, and not a business. Second, it is a difficult profession, requiring special preparation. Third, a man should devote his life to it.

If we stop to consider all the knowledge which is required for an expert administration of municipal affairs, we shall see how absurd it is to expect that a man can successfully take the leadership in municipal administration without proper training and experience. We can enumerate eight or ten different sciences, a knowledge of which is required for successful municipal government. Municipal government is something far more than a business, but looking at it

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even as a business it has its own peculiarities, which must be carefully learned by suitable preparation. Because a man has managed well a farm, it does not follow that without having given any attention to railways he can immediately become a successful railway president. No more does it follow that a successful railway president can administer excellently the affairs of a city. Here we have a clue to the reaction so often seen in our cities from the business man to the professional politician. The business man who is a business man and nothing else, is not equal to the undertaking, so frequently it is found that with all his defects the professional politician does as well or better, because he has at least had experience. I thus reach a conclusion which I wish to emphasize with all the force at my command, namely, that we must have a class of office holders.

THE BUSINESS VS. POLITICAL ADMINISTRATION

We can choose between two kinds of office holders, but that is all. Our twentieth century municipal reform increasingly accepts this proposition in practice, although it is not often consciously accepted by our people as yet.

It does not follow, however, that we must give ourselves up to a class of office holders, and allow them to rule us as they will. Offices are divided into two kinds, legislative and administrative. The function of the legislative officers is to exercise a general control and to represent the community. The municipal council, of course, is the proper legislative body. The municipal council should include men representing all the different interests of the city. The administrative offices, on the other, should be filled by experts, with permanent tenure of office. If the mayor of a city is to be regarded as an ad-

ministrative officer, then his tenure should be permanent; if he is to be looked upon as a legislative office, then he should be taken from among the citizens, and should not have a permanent tenure of office. It would seem, however, that he ought, in truth, to be regarded as an administrative officer, although I am aware that it is possible to look upon his office in still a different manner from either of those named.

TRAINED OFFICIALS NEEDED

If some say that the methods suggested are German methods, I reply that after all they are old American methods, and have been used in this country, and are still used, where we have the best public administration. The methods which the German city uses are quite similar to those which we use in the management of our best state universities. The instructional force is composed of experts with a permanent tenure of office, or at any rate, a tenure during good behavior, with promotion for merit, and a board of regents, which corresponds to the municipal council, is composed of those who represent the community, and see that the university accomplishes the purposes which the people of the state desire it to accomplish. They establish a general policy, but turn over the details requiring expert knowledge to the faculty, which has this knowledge.

But I have said that the city is something far more than a business concern. This business concern idea of the city does not, as a matter of fact, move the masses of the people sufficiently to arouse a great amount of genuine enthusiasm. We need a broader basis of reform, and a higher aim, and this is afforded by a new rallying cry which we are beginning to hear, namely, the city a well-ordered household. It is this idea which is giving form and shape to the twentieth century city.

GOOD ROADS FOR THE SOUTH ASSURED

Obtained by an Educational Movement—The "How" of Road Construction - Road Machinery an Absolute Necessity—
"Keeping Everlastingly at It" Will Insure Good Roads

By William E. Voorhees*

It is a notable fact that the American people take keen delight in overcoming difficulties; this is especially true where the difficulties bar the way to commercial supremacy. The courses of rivers have been changed, mountains have been tunnelled, harbors have been deepened, cañons have been bridged, and many other apparently insurmountable obstacles have been overcome that the comforts and conveniences of the people might be assured, and that the products of one section might be quickly transported to another. The courage and resolution which actuated our forefathers in overcoming the relentless forces of nature have been handed down as a sacred heritage to succeeding generations, and these traits have at last been brought to bear against that most refractory of all public problems, the improvement of the public roads.

A QUESTION OF IMPERATIVE IMPORTANCE

The question of improved highways is one of superlative bigness. When it is taken into consideration that there are 80,000 miles of roads in the State of Pennsylvania, and that less than 5 per cent. have been reduced to first-class highways, something of the magnitude of the question can be grasped. The improvement of even the main travelled thoroughfares in this country means the overturning of old ideas and customs, the revision of antiquated laws, the spontaneous effort of progressive people everywhere, and the expenditure of millions of dollars. There are difficulties, many and vexatious, but over against them is the well established fact that good roads are necessary to the comfort, welfare and prosperity of all our people, and it requires no sort of a prophet to announce that one difficulty after another must eventually disappear until this country is gridironed with such highways as will be commensurate with the proud position it holds as one of the great civilized powers of the world.

The first, and greatest difficulty, is that the people all over the country are not fully aroused to the necessity for better roads. No man ever yearned for knowledge until his ignorance became painfully evident, and no community ever cared to give up bad roads until they knew something of the blessings of a better kind. There

never was a reform that amounted to much until the masses got behind it, and when they begin to push it is bound to go. The people, therefore, must be made to understand that the construction of good roads is a business proposition; that their comfort, convenience and prosperity depend more upon the condition of the public highways than upon any other factor, social or political. These facts should be understood, not in a general way, but clearly and forcibly; they must be driven home and spiked down until every man of sense and intelligence in every community is a good roads advocate.

Another difficulty—and an important one—is the lack of knowledge on the part of most people as to how a good road should be constructed. A carpenter cannot build much of a house without a plan, and no man can be expected to build a road if he be without knowledge of the rudimentary principles of highway construction. As much skill is required in the building of a road as in the preparation of the bed for a railroad, a green hand cannot build the one any better than the other. Road makers need to be educated, therefore, and the best education is that which shows how the road is built, including the materials that are used and the machinery that is employed in its construction.

PRACTICE WILL OVERCOME DIFFICULTIES

To overcome these two principal difficulties it is necessary not only to preach but to practice, not only to talk good roads but to build them. A printed description is good, a picture is better, but the object itself, standing out in all its truth and reality, makes the best and most lasting impression. The campaign of education naturally divides itself into two parts: the theoretical side, or that which shows the people by facts and figures the necessity for good roads and the advantages of their use, and the practical side, or that which shows the people by object-lessons just how good roads are constructed. It follows, therefore, that any plan which combines these two distinct features of the movement will meet with the best results.

A number of years ago the League of American Wheelmen inaugurated a crusade for better roads, which was productive of

* Kennett Square, Pa.

excellent results. Conventions were held in all sections of the country, and good speakers pointed out the advantages that would accrue to any section by the systematic construction of first-class highways. The press took up the question and did yeoman's service in the work of agitation. It developed before long, however, that agitation alone could not bring about the results desired. Something of a more practical nature was needed. With this idea in view the road inquiry branch of the United States Department of Agriculture arranged, with local help in each case, to build sample roads in various sections of the country. Small stretches of macadam highways were accordingly built at New Brunswick, N. J.; Hot Springs, Va.; Geneva, N. Y.; Washington, Pa., and at other points. It was the intention that these sample sections should simply form the nucleus of a fine system of highways at each of the places where they were constructed. The work was necessarily much restricted, as, on account of a lack of funds, not more than two pieces

over three months, and more than a dozen points were visited and sample roads built at each place. The results achieved during this trip were so highly satisfactory that arrangements were made to start another train during the fall of 1901 over the Southern Railway, all of which has been previously described in the MUNICIPAL JOURNAL AND ENGINEER.

The work of equipping this train with machinery was left in charge of the "Good Roads Machinery Company," of Kennett Square, Pa., which furnished about \$10,000 worth of its special rock-crushers, engines, rollers, road graders, etc., and secured from other firms such other special machinery as might be required, including elevating graders, dump wagons, steam rollers, etc. The road making appliances furnished for the train were the most modern, convenient and up-to-date that could be secured, and this machinery alone was a source of much educational value to the large numbers who inspected it at the various stopping points.



1. CHAMPION CRUSHING PLANT AT WORK, ASHEVILLE, N. C. 2. CHAMPION CRUSHING PLANT BREAKING STONE, GREENVILLE, TENN. 3. SAMPLE ROAD AT CHATTANOOGA, TENN. 4. STEEL CHAMPION SPREADER AT BIRMINGHAM, ALA.

of sample roads could be built in any one year; it soon became evident, therefore, that it would be a matter of many years before enough sample roads could be built to make any considerable showing.

THE N. G. R. A. HELPS THE MOVEMENT

At this point, the National Good Roads Association, an organization formed by public spirited men, some years ago, with headquarters at Chicago, and with branches in every part of the country, took up the work. This association conceived the novel idea of running a train of cars fully equipped with up-to-date machinery and expert road builders, over a certain route, and of building sample roads at different points along the line. Through the co-operation of the Illinois Central Railway and a well-known firm of road machinery manufacturers, the first good roads train was started during the early part of 1901. The route was through the States of Illinois, Kentucky, Tennessee, Mississippi and Louisiana. The trip lasted

THE WORK OF THE GOOD ROADS TRAIN

On the 29th of October, 1901, the second good roads train, consisting of thirteen cars of machinery, two observation cars and one camp car, left Alexandria, Va., for an extended tour of the South. This train was accompanied by Messrs. W. H. Moore and R. W. Richardson, president and secretary of the National Good Roads Association; Mr. M. O. Eldridge, of the Road Inquiry Department; Mr. M. A. Hayes, superintendent of the Industrial Department of the Southern Railway; Mr. W. H. Edwin, chief engineer of the National Good Roads Association; Mr. E. J. Richardson, secretary of the train; eight expert road machinery operators; a representative of the press, and a photographer.

Stops of about one week in duration were made at Winston-Salem and Asheville, N. C.; Greenville and Chattanooga, Tenn.; Birmingham, Mobile and Montgomery, Ala.; Atlanta, Ga., and Greenville, S. C. When the train reached a point at which work was

to be done, the machinery was quickly unloaded by the men in charge, including a corps of laborers furnished by the Southern Railway. The wheel and drag scrapers, road plows, road graders, dump wagons, and the big elevating graders were put to work preparing the foundation for the stone road. In the meantime, the crusher had started to crush stone, and as soon as the foundation was ready, a dozen carts and wagons hauled the crushed material to the roadway. As fast as each layer of stone was put down it was rolled and packed by the steam road roller, with the result that in four or five days a stretch of about one-half a mile of complete macadam road was laid. The road graders were then put to work and a piece of model earth roadway was built.

Long before the train arrived its coming had been widely advertised, and large numbers of road officials and others interested in the work were on hand from far and near to take part in the deliberations, and to witness the construction of the sample roads. As soon as possible after the arrival of the train a convention was held, at which prominent and able men delivered speeches calculated to arouse the enthusiasm of their hearers. Local organizations for the improvement of highways were formed and officers elected. President Moore and Secretary Richardson, of the National Good Roads Association, who are entertaining and forceful speakers, explained the work of the good roads train, and with their wide experience were able to give much practical information along the line of suggestion for road improvement. The aim from first to last was to make all of the speeches practical and helpful. A feature of this part of the work which always aroused much enthusiasm was the lecture, illustrated by stereopticon views of good and bad roads, given by Hon. M. O. Eldridge, of the Road Inquiry Department. After the work of constructing the sample road was under way the delegates and visitors inspected the work, as well as the machinery used in its construction. The method of building from beginning to end was fully explained, and as the road was right where it could be examined, the information obtained was always of the most helpful character.

AN EDUCATIONAL MOVEMENT

In substance, this was the programme at every point where the train made a stop. The thousands who attended the conventions and saw the sample roads being built invariably went away not only deeply impressed with what they had heard and seen, but filled with a determination to do everything in their power to push the work of road improvement in their respective communities. This means that seed has been sown in all parts of the South that cannot fail to bring forth an abundant harvest.

It will be seen from the foregoing that the good roads train is

simply and solely an educational movement. It is not contended that any large amount of roadway can be built at any one point, but it is contended that the people can be furnished with the knowledge and the weapons which will enable them to work out their own salvation. If the lessons which this plan aims to teach are rightly understood and accepted the benefits that will accrue to every part of the South are many and far reaching. The principal lesson taught is that good roads can only be secured by the adoption of modern methods. The shovel, the pick and the hammer were the tools of our forefathers; they are now out of date and should be thrown aside for more modern appliances. The beginning of good roads is improved machinery; and after machinery, capable men to operate it and to superintend the work of road making. The two most important factors in the work of road improvement are, therefore, knowledge and improved machinery.

It is not contended by any man familiar with the conditions, as they exist, that the change from poor to good roads can be brought about in a month or a year. The important point is to make a start in the right direction, and the desired result is sure to come. The dirt roads should be kept well graded, drained and in good repair. To do this it is necessary to use the road grader, an implement with which most road officials are familiar. At their best, however, dirt roads are not to be compared with stone roads, and in every section where stone is conveniently at hand, a start should be made in the work of building permanent macadam highways. They can only be constructed economically, however, by the use of the modern rock-crusher and road roller. Under ordinary circumstances field or quarried stone can be broken for road metal by means of the rock crusher, at from six to fifteen cents per cubic yard. No better argument need be offered to show why every city and county in the South should own and operate a crushing plant.

There has never been a time in the history of the movement for better roads when the people everywhere, but especially in the South, showed such an earnest disposition to secure information as at present. Before the train had fairly started on its recent trip President Moore was in receipt of several hundred communications from towns and cities requesting that arrangements be made to have the train stop at these points. Naturally, it will not be possible to visit all of them in the near future, but the work of the good roads train will go on during the coming winter and spring; point after point will be visited, practical information will be disseminated, and those who have the work in charge can point with pride to the fact that the train is leaving in its wake a broad trail upon which is written in letters as enduring as the granite hills the words, "Good Roads for the South."

NEW ORLEANS SEWER SYSTEM

THE systems of drainage and sewerage which the city of New Orleans, La., is about to build will cost in the neighborhood of twelve and one-half million dollars, and the plans will call for as complete a system as it is possible to install. Had there been the money ready, it is likely that the work would have been undertaken long ago. The problem of properly sewerage the city is probably as difficult a one as has ever confronted any city and the amount of drainage is greater than that of any other city in the United States. Everything connected with the plan on foot will be carried out in an up-to-date manner and the best of machinery installed.

The conditions to be overcome by the sewer system are most difficult, for the city is situated on a plain eighteen feet below the level of the Mississippi River at high tide. The discharge ends of the canals in some cases will be twenty-five feet wide and twelve feet deep, permitting a discharge of 1,200 feet per second. They will be kept free of water so that, after a rain storm, which is usually very heavy, they will act as reservoirs and aqueducts to the pumps. The daily sewage amounts to about 20,000 gallons and, to avoid any possibility of the small amount of sewage moving so slowly that in hot weather it would dry up on the drainage canals, the sewer system will be entirely separate. This will also prevent the pollution of Lake Pontchartrain by the discharge of sewage into its waters.

Lateral canals will be run parallel to the Mississippi in the lowest part of the city and both these and the main canal will be lined and covered and run under the city streets. The streets will be supported on brick and concrete walls and steel arches. When the system is completed, the drainage will be carried below the city and pumped into Bayou Bienvenue, which will carry it into Lake Borgée, an arm of the Gulf. As the volume of drainage is at times too great to be thus disposed of, the surplus will be run into Lake Pontchartrain at three different places.

A central power house with a capacity of 10,500 horse-power and nine pumping stations will operate the system. Three stations will pump from the drains into the open canals that lead to Lake Pontchartrain and thus directly relieve the city. The other stations will be erected along the main canal leading to Bayou Bienvenue. The water will thus be lifted from one station to the other and so on to the end.

The drainage system, that has been in vogue heretofore, is a series of gutters close to the sidewalks, but these have such slight slope that the rain water is not run off rapidly and the streets are flooded. Two old-fashioned paddle pumps drain the street water into Lake Pontchartrain and the water left by the pumps becomes stagnant and dries up.

THE MODERN WOODEN BLOCK PAVEMENT

Three Essentials Required—A Substantial Foundation—A Selected Wood Suitable for Paving Purposes—Proper Treatment of the Wood

By P. C. Reilly

THE failure of wooden block pavement in the past and now is traceable to the use of timber entirely unsuited for paving, to the use of the same "green," or treated, with an inferior preservative material, and to very imperfect construction which usually consisted of laying the blocks either on sand or plank foundation. As a consequence, where the traffic was heavy the pavement soon wore out; where the traffic was insufficient to wear out the pavement it soon rotted out. Wood pavements, therefore, were universally condemned in this country. This was the condition when, in 1896, we submitted to the public the improved wooden block pavement.

SATISFACTORY RESULTS

The result has been more than satisfactory. Our pavements in Chicago, Indianapolis and other cities have been so successful that they have won the admiration of all who have inspected them, and have been most favorably referred to by writers. Of course, experience suggested some improvements in the earlier ones, resulting in the production of the Kreodone-Creosote wooden block pavement, which is the most nearly perfect pavement known, adapted alike to boulevards, residence streets, and heavily trafficked streets, because it possesses the qualities of great durability, cleanliness, sanitariness, and is the least noisy of all durable pavements.

The success of this particular kind of pavement has naturally brought forth wooden block pavements treated with other preservatives. Many adulterants have been offered as substitutes, each one claimed to be "the best." Reference is made to the wooden block pavements which have proven successful, and the deduction is drawn that the new pavement, without having been in use, is the better pavement. The use of these adulterated mixtures the value of which has not been established, and which, in theory, do not possess the essential elements required of a preservative, is the one danger to be guarded against, else wooden block pavements will deteriorate and in a few years will again be condemned, as it will take a few years for even an inferior pavement to develop its weakness, yet in the interval it may be most attractive in appearance and give every evidence of durability.

THE RIGHT PRESERVATIVE AN ESSENTIAL

Wood untreated is good for a time; wood treated with even an

inferior material, if first sterilized, is good for a longer time; but neither is *the best*. There is ample evidence of the durability of long leaf yellow pine untreated for a short time in Chicago on some of the most heavily trafficked pieces of roadway in the United States. In two years' time the pavement had a perfect appearance. Reports from London show that Swedish deal, a much lighter and less durable wood than our long leaf pine, and where the blocks were merely dipped in creosote oil, lasted over seven years. In Indianap-



MICHIGAN AVE., CHICAGO, PAVED WITH KREODONE-CREOSOTE BLOCK

olis there were put down, in 1896, about 75,000 yards of Washington cedar under specifications providing for the dipping in creosote oil, but pressure was used so as to inject three to four pounds of oil to the cubic foot. Although the specifications did not require it the wood was thoroughly sterilized and the albuminoids removed before creosoting. This Washington cedar is described by the United States Department of the Interior (Forest Trees of North America, Vol. 9, 10th Census) as follows: "Wood very light, soft, not strong, brittle, rather coarse grained, specific gravity .38, weight per cubic foot, 23.66." These pavements at the expiration of five years are in excellent condition, and look nearly as well as the long leaf yellow



HEAVILY RESINED TIMBER, WORM EATEN AND DESTROYED



N. DELAWARE ST., INDIANAPOLIS, IND., KREODONE-CREOSOTE PAVEMENT

pine creosoted under specifications requiring the use of ten to twelve pounds of oil to the cubic foot. The long leaf yellow pine in the same report is described as follows: "Wood heavy, exceedingly hard, very strong, tough, coarse grained, compact, durable. Specific gravity, .70. Weight per cubic foot, 43.62 pounds," nearly twice the weight and gravity of the cedar, besides being a strong, durable wood, while the cedar is brittle and not strong.

The fact that the cedar block pavement under dipped specifications, looked as well in three or four years' time as long leaf yellow pine in the same period does not indicate that it is as good a pavement as the well treated long leaf yellow pine pavement. It is not, and it will not last nearly so long. It emphasizes the fact, however, as does the result in London, that a period of from two to five years is too short a time in which to demonstrate the durability of any particular kind of pavement. The dipped creosoted cedar block pavement laid in this city was put down under a guarantee of seven years, the long leaf yellow pine, under a guarantee of nine years, showing that both the city and the contractors expected better results from the long leaf yellow pine than from the cedar; yet both expected the cedar pavement, though much the inferior, to be in perfect condition at the end of seven years.

THE ESSENTIAL FEATURES

The three essential features are: the use of proper wood, the proper treatment of the same and proper construction. It is easy to obtain the proper wood; it is easy to secure the proper construction; but the utmost care must be taken that the preservative material used shall possess the necessary quali-

ties for paving purposes, and to secure this is a much more difficult matter. The wood should be either long leaf yellow pine, tamarack, or fir—any one will suffice—and the preservative used in the treatment of the same should be rich in germicidal and preservative and non-volatile properties, and one that will not become soluble in, or saponify with, alkaline waters, such as rain water, lime-water, etc.; and that will be unaffected by acids, heat or cold, so that the pavement will not be injured by the extremes of temperature, or by the constant exposure to water and other natural agents.

The necessity for caution in selecting the proper preservative material can be best illustrated by the number of different patents and different mixtures which are now, and have been at various times, on the market for the preservation of wood, creosote-glue, creosote-zinc, creosote-rosin, zinc-tannin, and others too numerous to mention. Most preservatives, however, have creosote oil as their base. But the United States Department of Agriculture (Division of Forestry, Vol. 9, 10th Census), after most thoroughly and scientifically studying the question—and there is no one more interested in the

matter than the Government because of its anxiety to protect our rapidly depleting forests—declared that the best known wood preservative was creosote oil, and this opinion is concurred in by the scientific men of Europe and America.

A pavement of the proper wood, treated with the creosote paving oil, as above described, and placed upon a concrete foundation, will have the durability of granite without its roughness and noisiness.



RUSH STREET BRIDGE, CHICAGO, ONE SIDE PAVED WITH KREODONE-CREOSOTE BLOCK



AMONG THE IMPROVEMENT CLUBS

Report of Harrisburg Committee—Calendar from Woman's Civic League, St. Paul—Year's Work of the League—Hints from North Dakota—More School Gardens—A Boston Settlement—Southwestern Items

By Charles Mulford Robinson

AN enthusiastic citizen of Harrisburg, Pa., sending to the MUNICIPAL JOURNAL AND ENGINEER the report on proposed municipal improvements, published by the executive committee to the subscribers of a fund for investigating the subject, says: "I am sure it is the greatest thing on earth." That is an attitude of mind which generally means much for a city if it be held at all commonly. It was precedent notably to the greatest days of Rome, of Athens, and of Florence. And the report, which fills a pamphlet of nearly one hundred and fifty pages enriched with charts, maps, and illustrations, is a great thing. It stands for one of the most interesting voluntary efforts for civic improvement of the day.

A necessity has arisen in Harrisburg for the expenditure of a good deal of money for improvement, if the city is to hold its proper place among modern municipalities. By a happy coincidence, it is possible on the present assessment for the city to create an additional indebtedness of upwards of a million dollars without infringement upon the constitutional limitation. A body of public spirited citizens, therefore, desirous that the money may be spent in the wisest manner, subscribed a fund of more than five thousand dollars to provide a means of procuring from national experts, without expense to the community, harmonious and logical plans that should command universal respect. When the fund had been collected, an executive committee of seven was appointed with power to employ experts to make up the report. The committee was wisely authorized also to invite the Mayor, City Engineer, and one councilman from each body to act with it. After a preliminary survey of the ground, the committee thought it advisable to divide the subjects for consideration under three general heads, and to employ an expert for each of these divisions. The divisions were: First, water system and sewerage; Second, improvement and extension of parks; Third, improvements of streets, with special reference to the paving. This shows how broad has been the scope of the investigation. The experts chosen to make the investigations and report were: On water and sewerage, James H. Fuertes, of New York; on parks, Warren H. Manning, of Boston; on streets, M. R. Sherrerd, of Newark, N. J. To their respective subjects, these gentlemen gave most conscientious study after painstaking research. Their recommendations, published in full by the committee, are heartily endorsed by it. The committee, in presenting the report, suggests that councils be requested "to pass the proper ordinances looking to the submission to the voters, at the spring election, of the question of incurring the debt necessary in making the improvements contemplated." Since the report was issued, councils have passed and the mayor has signed these ordinances, and a campaign has begun to overcome the opposition of those who are always opposed to municipal expenditures. This campaign is under the general charge of the Harrisburg League for Municipal Improvements. It has three org committees: The executive committee, which is responsible for the report; the campaign committee, and the citizens' committee.

Outside of Harrisburg, the means employed to procure this report are far more interesting than the specific recommendations in the report. The collection, by voluntary subscription of a fund to defray its expenses, and then the employment of outside experts to draw up a general and consistent scheme of improvement, these are the features that are full of suggestion and interest to other communities. And such is the credit they reflect on Harrisburg's public spirit that the outcome of the campaign can hardly be doubted.

Calendar of Woman's Civic League, St. Paul

Of the Woman's Civic League, of St. Paul, this department has already had one occasion to speak. Frankly defined in its own publications as "an organization of women who do things," it is so independent and energetic, that there will probably be other oppor-

tunities to refer to it. Its latest achievement is the preparation of a calendar for 1902. This calendar must be pretty nearly unique, certainly it is interesting and suggestive. It is in pamphlet form, artistically printed, profusely illustrated, and has an attractive cover. It includes a programme devoted to the club's study "of the Arts and Crafts, with casual attention to the methods of the Artful and Crafty." This "casual attention," however, takes up the greater part of the book, and is devoted to verses by "Anybody," and to illustrations. The creed of this civic league is published on a page by itself and is worth attention. "We believe," it begins, "in manual training, children's playgrounds," and so on through a long list in which are, for instance, "less smoke, more money for parks, the preservation of the forests," etc., in "an eight-hour day for everybody but ourselves—we work fourteen." "We believe," it continues, "that school buildings are not necessarily blots upon the landscape. * * * We believe that our Health Commissioner is the 'best ever,' that our City Engineer is all right. * * * We believe we have a Mayor. We believe there are honest aldermen. We believe we have discovered three. We are holding our breath until we are sure. We believe that an ounce of work is worth a pound of talk. We believe in our town; in its future and in its present. We believe in ourselves as among its most enlightened, disinterested, conscientious, public-spirited citizens." It is little wonder that a large society, publicly professing such a creed, brings things to pass. The verses, to which, with the illustrations, a couple of pages are devoted for each month, are mainly or wholly local hits. An example is one that begins,—“with apologies to a member of the school board”—“All schools look alike to me.” The season's study programme shows a series of addresses on arts and crafts subjects. The whole calendar is well calculated to keep strong the interest of the club members throughout the year, and to do this the more effectively because good humor tempers the desperate seriousness. Because of this, too, the calendar will be powerful outside the club, for there is no weapon so sharp and sure as ridicule.

SMOKE AND GOOD TEMPER

This league has attacked the smoke problem. The section that deals with its futile efforts to suppress the smoke nuisance discusses a subject that is not merry, but the description is picturesque and entertaining. "We succeeded," writes the president, Mrs. Conde Hamlin, "in doing what no power in the city had hitherto been able to do, that is, in getting the ordinances actually enforced for about a week. The Mayor's orders were positive. Several arrests were made, prosecutions by the city were conducted with vigor and judgments were rendered against several offenders. It was proved, to most people's satisfaction, that there were smoke consumers which consumed smoke and smoke preventers which prevented smoke. But on an evil day it fell out that an officer on 'the force' said unto himself, 'Go to, this is my day for arresting somebody!' He put his telescope to his eye and, turning his back upon the wicked city where burglars and gamblers and such like birds of night disport themselves, and where a forest of chimneys was belching furiously, he espied a flying plume of smoke outlined upon the horizon of the Sixth ward. 'Ah!' said he, 'there's my man,' and he went forth and laid rough hands upon him and fetched him into court. Now it happens in this city that there is one whose cry strikes terror to all hearts—it is the manufacturer. When the manufacturer doesn't like anything he says: 'If you interfere with me, I won't play on your cellar door any more, but I'll go over and play in Minneapolis.' That settles it. It mattered not that in this case he bought two smoke consumers on his way home, which people in his employ testify not only materially decreased the smoke, but saved fuel as well. The mischief was done. The newspapers went into spasms and told how there was 'money in the smoke,' as the current saying

runs in Pittsburg. Far be it from the loyal women of the Civic League to interpose a barrier to the tide of our city's prosperity. Rather, let our carpets lose their patterns and our draperies forget their color—if there's 'money in the smoke' our lords can buy us more. Though the clothes we wear be ruined, though the air we breathe is foul, though we cannot see the sun, we will wipe our smut-begrimed faces, oh, my sisters, and be joyful, if there's 'money in the smoke.' But the league has proved by its efforts that it thinks there is more money in the absence of smoke.

SUCCESSFUL EFFORTS

The league's efforts were not all futile. It rescued from oblivion and secured the passage through the legislature of two bills. One of these (House Files 637) provided for the planting of trees in street lawns by the Park Board, on the petition of a majority of the property owners in a given street; the other (638) provided for the cutting of grass on street lawns on a similar petition. Hundreds of feet of vacant property which had been an eyesore were put in clean and orderly condition through the organized efforts of the women. In one ward the active co-operation of the school children was secured and a children's auxiliary was formed which christened itself the Junior Civic League. The educational committee was active, providing a circulating library of two hundred volumes, opening a reading room, and establishing a series of free weekly entertainments of high quality in a school in a foreign settlement on the river flats in West St. Paul. Several playgrounds were equipped and conducted under the League's supervision; it took action looking to a pure milk supply, and for two months waged a contest—finally successful—from committee room to council chamber and from council chamber to committee room, for a better system of garbage collection. As precedent to this contest, the women carried on for five months a systematic campaign of weekly inspection and report in the business wards. These wards were divided into districts, and a woman inspector was placed over each. At the league's request, waste paper boxes were placed at the street intersections in the business part of the city, and the league joined with other organizations in providing a series of valuable lectures on municipal life. It was, also, represented on the committee that framed the sanitary provisions of the revised city charter. So it has proved itself an extremely energetic body of public spirited citizens.

Hints From North Dakota

The committee on education of the North Dakota Federation of Women's Clubs has sent out a circular letter on the work that should be done by the women of the State in this department of club activity. The circular has been kindly sent to the MUNICIPAL JOURNAL AND ENGINEER and is of particular interest because it lays stress on the educational phase of town improvement work. It says:

"Let a special effort be made to forward the cause of town and village improvement. This is an important as well as interesting phase of work of which there is much need in our new, Western, communities, and at present there is no organization to agitate or promote it. Our present neglected streets, walks, parks, and cemeteries are a menace to the higher educational ideals we would have established for our children."

The last clause is very pertinent, and worth a thought. It is supplemented by another appeal for a concrete form of improvement work which may be considered as belonging especially to educational efforts. The circular says:

"Clubs may do much toward cultivating the artistic nature of the child, by gifts of pictures, casts and plants for decorating the school room and by recommending improvements in buildings and furnishings, such as tastefully tinted walls and properly shaded windows."

It is clear that the town improvement movement may fairly look for allies among those interested in educational efforts.

Minneapolis School Gardens

Considerable space having been devoted here—in the November and December numbers—to the discussion of school gardens, some one sends to this department a long article from the *Minneapolis Journal* on the interesting school garden work in Minneapolis. In this case the gardens seem to be educational more largely than deco-

orative, though some good work has been done in the latter direction. At the Horace Mann school, for instance, it is said that the children have taken just as much interest in beautifying the grounds as in looking after the vegetables and flowers. The lawn was sodded by the boys, and in the spring the children brought their old wornout rubbers to school. The pile was so large that it was sold for \$50. With this money a hedge was planted around the garden. The Horace Mann School garden is said to have been the first in Minneapolis, and to be mainly due to the enthusiastic efforts of Miss Florence A. Lillie, one of the teachers. She secured the use of a vacant lot across the street from the school and had it plowed. On Arbor Day the larger boys set up the posts for a fence of wire netting, digging the holes and filling them in after the posts were set. Fertilizers were spread over the ground and before the seeds were sown the whole lot was carefully laid off in beds. All the children had something to do with the garden, and the first appearance and subsequent growth of the plants was watched with the keenest interest. There were really three gardens in the lot. In one the various beds were devoted to the different grains; in another to vegetables, and in the third to flowers. When school closed, there was a call for volunteers to take care of the garden during the summer, the reward to be the flowers and vegetables they raised. There were more applicants than there were beds. A retired farmer who lived in the vicinity offered to oversee the work, and in spite of unfavorable weather conditions the children were very successful. The garden will be carried on next season. Several other Minneapolis schools have gardens. At the Clay school, the boys planted vegetables and the girls planted flowers, and each room had a bed. A hedge for the garden was made by planting a row of sunflowers. The Pierce school, which is a new building, was surrounded by sand, and the boys had to bring loam from the woods in wheelbarrows. The Minneapolis Improvement League has taken action to encourage school garden efforts.

Civic Service House, Boston

ONE of the most interesting altruistic efforts in Boston to-day is the Civic Service House. This is situated on Salem street, and is the headquarters of the Civic Service League, and is a Settlement. Built largely through the influence of Mrs. Quincy A. Shaw, it is under the charge of Mr. Meyer Bloomfield, recently of the University Settlement in New York. The claim of the institution to a mention here appears in the practicalness and pertinence of its method of instruction in civics. It teaches, for example, that every man has a right to expect a certain amount of sanitary protection from his city, and that, secondly, he himself has a certain duty in assisting the city in the efforts to secure this. Then it supplements the theory by organizing a committee to see that the garbage and ashes of the neighborhood are properly disposed of and that the legal amount of sanitary protection in the way of plumbing and ventilation is granted to every tenement. This is a very practical sort of instruction and makes for better citizenship by a far shorter road than the promotion of general culture.

Southwestern Items

THE women of Houston, Texas, have lately issued a call for a meeting to form a permanent organization for civic improvement. The scope of their enterprise and courage is illustrated by the following convenient list of "Objects," which, they think, may well engage the attention of such an organization. If any one is wondering what work could lie before a town improvement society in his own community, he should con this list: "Cleansing and beautifying public buildings, care of vacant lots, improvement of back yards, good streets and alleys, prize awards for home planting, preservation of historic buildings and localities, preservation of groves and natural features, removal of unsightly places, removal of objectionable bill boards and advertisements, school gardens, street and roadside planting, and general study of civic work."

In Sioux City, Iowa, a park promotion association has been formed for the purpose of establishing small parks. Its announced plan is to have the land purchased from a fund to be provided jointly by the city and the especially benefited property owners.



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STREET SIGNS AND ADVERTISING

IN the matter of street signs and advertising the new administration of New York City has a vexatious problem to contend with. While there is considerable public sentiment formed upon this subject and while there have been agitations in some of the larger cities leading to the elimination of some of the evils and the general regulation of public advertising, there has been no crystallization of sentiment as is found on the other side of the Atlantic. For the past ten years the "Scapa" organization of London has made vigorous protests against the evil in that city, and has been enabled, through a combination of influences, to bring about a material reform in this particular. The first city of the New World should lead here in this regard; and it is only stating a truism to reiterate that American cities should begin to consider plans for their aesthetic adornment—practical, and adapted to the various local needs, as well as to the local treasury. The Metropolis should maintain its supremacy by being the first to settle this question.

So far as concerns public property—parks, public buildings, street intersections, docks, bridges, and lamp, police, signal, telephone, and telegraph posts—the jurisdiction is perfect, not merely to prohibit all that offends taste, but also to provide such artistic and effective boardings, bulletin-boards, and advertising columns for the display of proper advertisements and notices, as at once will discourage private vulgarity, and bring to the city a large and increasing rental.

In regard to the restriction of present methods, all the parts and appurtenances of every plant used in exercise of any franchise can be regulated in this respect as a condition of such franchise. By proper building laws and regulations against obstructions and incumbrances, equally complete prohibition or regulation can be had of every sign, awning, sky sign, exterior "fixture," or part of structure that either projects beyond the building line or is not a part of the building itself; and the material, construction, and dimensions of "boardings" can be equally controlled. Police regulation is competent to handle every form of "flash," or changeable, sign or emblem.

As to taxation, advertising in every form (except, possibly, use by owner of building of its walls or windows in connection with his own business there carried on) can be classed as a special occupation, subject to license on terms and conditions to be prescribed, such as size and color of lettering, height above street, etc.—these

conditions being such as to regulate, rather than prohibit, the business as a whole—and a large revenue can thus be secured.

Where it is desired to restrict use by private owners of their own property, e. g., facing on a park, whenever lands are condemned for a park or street opening, there should be included such restriction of lands about as may be necessary for the purpose indicated. This would generally be such actual benefit to property thus restricted that damages could rarely be shown, and any awarded would generally be assessed back upon the fee thus restricted. In case of property fronting on parks already open, its condemnation to restriction only would generally involve only the slight cost of the proceeding itself—the fact and probable award in most cases being that, all considered, the value of the property was actually increased by a restriction which produced it as well.

The above suggestions by no means exhaust the possibilities under precedents already made and suggested by legal decisions; but, I believe, are ample for enforcement of all canons of taste and propriety that public opinion would now demand or approve in this regard. The most urgent need of all, however, is to rouse public opinion and educate public taste. As to how loud the reveille and how primary the teaching needed—witness the advertising for which our most dignified art association rents its premises; the similar prostitution by our city of enclosures within which it is building our finest buildings, the "yelling" blazon of their piano-makers' name that our concert impresarios flaunt in the face of opera-house audiences, and many another indication that here, as in other countries, it is representatives of culture that must themselves be taught before they can lead.

JOHN DEWITT WARNER.

ANTI-METER NONSENSE

THE water meter question continues to engage the attention of a number of leading cities. Some are for, and some against. Those who oppose the introduction of water meters seem to be influenced first, by ignorance, as from the very nature of the arguments which they advance, they furnish evidence of their lack of information upon the subject; second, an unwarranted prejudice. For example, our contemporary, the Buffalo *Evening Times*, says editorially: "Of all illogical or senseless propositions which have come before the public in recent years, the agitation for water meters is the worst. A plentiful supply of water, free as the air, is looked upon as one of the finest considerations of successful city life. The first cost of establishment and the current expenses of maintenance are properly put in a lump sum in the public estimates, but such a thing as a restriction of water consumption by a calculating meter is so foreign to a rightful public policy hereabouts, as it would be to measure the air." This argument—if it may be dignified by that name—is not worthy the brain of a twelve-year old school boy. It is the purest kind of nonsense for *The Times* to compare water with air. Air costs the city of Buffalo nothing; everybody has free access to it; but it costs the city of Buffalo nearly two cents per one thousand gallons for water delivered to consumers. Two cents per one thousand gallons may seem insignificant to *The Times*, but when it is taken into consideration that the city of Buffalo used last year more than three hundred gallons of water per capita per day, the extravagance of such a course will be readily understood. For instance, thousands of consumers are permitted to allow their water to run in winter to keep the pipes from freezing, and in the summer to keep the water cool. While there may be regulations against this everybody knows that there is no attempt to enforce them.

The cities of Great Britain and Europe use water economically and the per capita consumption seldom exceeds forty gallons per day. The average is much larger in this country, although there are a number of cities where meters are used with an equally low average, but a hundred gallons per day per capita is considered a most liberal allowance for any water department. This means that Buffalo is wasting water at the rate of two hundred gallons per capita per day. The loss to Buffalo each year in water wasted, aggregates many thousands of dollars.

The use of water meters in no sense restricts a liberal use of water on the part of the poorest consumer. This has been demonstrated in Dayton, O.; Harrisburg, Pa.; Richmond, Va., and many other cities throughout the country where meters have been used to the

advantage of the department. The introduction of a meter simply prohibits the needless waste of water. That the use of the meter system has been effective in this particular is well known to those who are informed upon the subject. The people serve themselves with air and make various provisions by which they can get a full and free supply in their homes, and they are at liberty to help themselves at their own expense to all the water they may choose to take from the Niagara River or Lake Erie, but when they ask the city of Buffalo to pump water to them at the rate of two cents per one thousand gallons without paying for such expense, they are asking something unreasonable and *The Times* should be the first to recognize this fact.

EDITORIAL COMMENT

JUDGE P. S. GROSSCUP, of Chicago, recently handed down a decision denying an injunction to the People's Gas Company to restrain the city of Chicago from enforcing an ordinance placing the price of gas at seventy-five cents per one thousand feet. It was held that the city had a right to set and enforce rates for gas, provided that they were reasonable rates. This decision will have a tendency to lower the price of gas in other cities, and it is to be hoped that city officials will take every advantage of the precedent which it affords.

PRESIDENT ELIOT of Harvard University urges the adoption of a plan which will require Massachusetts cities to pension its school teachers. English cities pension street cleaners, day laborers, and other city employees, and we see no reason why the faithful school teachers should not be as well taken care of after a certain term of service. This would only be in harmony with the practice in some American cities in connection with the police and fire departments. The school teachers are quite as worthy of a pension which will ensure an adequate support in their old age as the men, who have given less time to special training to fit them for their several duties.

THE village of Medina, N. Y., recently congratulated itself upon the excellent terms secured from a local company for lighting its streets. The village agrees to pay sixty dollars per lamp per year for street lighting until one o'clock A. M. on a moonlight schedule, and at the same time grants a fifty-year franchise to the company. We fail to see wherein the village is to benefit in this contract, for there are hundreds of other villages which secure their light at a lower rate and without giving a fifty-year franchise. Except in the rarest instances a fifty-year franchise should be granted to no public service corporation. At the end of fifty years this village, it is to be hoped, will have learned this fact.

OUR contemporary, the *Syracuse Post-Standard*, seems inclined to poke fun at Alderman Regan for introducing an ordinance for the purpose of licensing every horse owned in Syracuse. We think the position of the *Standard* is unwarranted and that Alderman Regan should be commended, for horses do more damage to public pavements, with their sharp calked shoes, than anything else. In foreign cities the horses are not shod with calked shoes, and therefore the damage to pavements abroad is slight in this particular. It is good business policy for a city to make those agencies which do the most injury to permanent pavements, contribute to their repair. Other cities would do well to adopt the suggestion of Alderman Regan.

"EVERLASTING caution is the inevitable price of safety for private individuals," remarks the *Morning Democrat*, our contemporary of Grand Rapids, Mich. No matter what precautions may be taken to prevent it, a certain number of lives are sure to be lost every year through trolley car accidents; but in the interests of self-preservation the street railway companies should be required by all municipalities to exercise every caution and to utilize every device which will minimize the danger to passengers. Most street railway companies realize the truthfulness of this and are therefore willing to equip their lines with every appliance which will bring about the desired result. There are a few, however, which should be looked after by the civic authorities.

THE State of Minnesota is to have a new tax law. It will contain a number of important provisions which will greatly benefit the cities in that State. The new code will abolish the town board of review, but retains the town assessor. It will require assessors to view property which they assess, and taxpayers to list their property under oath at its true value. It will require exhaustive reports from all public service corporations, and will leave the gross earnings tax on railways intact. It will assess all street railways on an ad valorem basis, requiring a full statement from the company to which the assessor is to add the value of the franchise. Furthermore, it will require the assessment of gas, water, electric, power, wharf, and boom companies on their franchises, arriving at the values thereof by deducting from the stocks and bonds the value of the real and personal property. If the proposed bill becomes a law the tax burden, particularly in cities of that State, will be more equally distributed. The corporation will have less opportunity for evading its just proportion of taxes.

UNDER the caption, "Can Lexington Afford Sanitary Sewerage?" our contemporary, *The Herald*, of Lexington, Ky., argues in favor of sanitary sewerage for that city. There are too many citizens who ask the question in this way, when it should be asked, "Can the City Afford to Be Without Sanitary Sewerage?" *The Herald* quotes a well known sanitary engineer, who said:

"In Chicago, where they empty a good deal of sewerage into Lake Michigan and then pump their water supply out of it again, about 4,500 people died from typhoid fever in 1890, '91 and '92; that is, they died from an entirely preventable disease, while in the city of The Hague, Holland, where the best of sanitary conditions prevail, only about thirty deaths took place from the same cause, in the same years. Now allowing for the fact that Chicago had about eight times as much population as The Hague, it is still evident that Chicago suffered twenty times as many deaths as were necessary from that cause.

"When it is remembered that a large proportion of cases of typhoid do not result in death and that the distress, suffering and anxiety from such sickness generally fall upon that class of the community least able to afford sanitary precautions in their homes, or the expense caused by such illness, it will be seen what a feeble illustration the above statement is."

RECORDER CONNELL, the new Mayor of Scranton, Pa., recently read the "Riot Act" to the police force of his city, according to a local paper, charging some members of the force with failing to do their duty. Judging from the reputation of Scranton, the Recorder had good reason to administer this public rebuke, but at the same time, it is well to call to his attention the fact that the force may not be altogether to blame, for it is too small by more than half. For example, the State law of Ohio requires that each city shall have a police force on the basis of one patrolman for seven hundred and fifty population. The recognized standard throughout the country is one patrolman for every one thousand population. Those who are familiar with the police problems fully appreciate that adequate protection cannot be assured the general public with anything less. The reprimand of Recorder Connell to the force of his city is a bit of evidence to support this assertion. Scranton, with its population of over one hundred and ten thousand, should have at least one hundred and ten patrolmen. When the mixed foreign population which the city has is taken into consideration, the wonder is that conditions are not worse. A total force of forty-four men should not be expected to perform the duties of one hundred and ten men. Scranton may need better policemen, but there is absolutely no doubt that it needs more men.

STATE ENGINEER BOND, of New York, asks for a million dollars for good roads for next year. To some people this may seem like an enormous sum of money to be devoted to the general betterment of public highways, but it is none too much to meet the demands of the times. We are living in the twentieth century and we should begin to adapt ourselves to twentieth century responsibilities. There is none greater than that which demands the improvement of roads

throughout the Empire State. Last year the Province of Ontario appropriated one million dollars for the betterment of its highways. New York State should equal, if not exceed, the liberality of this Canadian province. A full description of Ontario's methods of road improvements was given in our January issue. It is high time that parsimony and old fogysm should be relegated to the rear by our State legislators when treating this question. The Empire State is immensely rich. Its debt, comparatively speaking, is a trifling one. Its tax rate is low and it has few material interests so essential to the comfort and welfare of its people as the improvement of its highways. What is true of the Empire State is true of nearly every State in the Union. There should be an advance all along the line during the next year. With the introduction of modern road making appliances for the same sum we are able to get fifty per cent. better results to-day than was possible twenty-five years ago.

WHEN Prof. A. W. Dow, government inspector of asphalt and pavements, of Washington, D. C., speaks well or ill of any kind of an asphalt pavement, his comment is worthy of consideration. For this reason we took occasion to verify a recent press report, which made him say: "Basing my opinion on what I have seen of this pavement, it exceeds in good qualities any pavement I have ever seen laid." In reply to our inquiry as to whether he had been correctly reported, he answered affirmatively. Mayor Smyth of Charleston, City Engineer Southgate and Mr. George W. Stainback, chairman of the Board of Public Works, of Nashville, Tenn., spoke in equally high praise of the sample of bituminous pavement which was recently laid in Charleston, and confirmed the press report. The ideal pavement has not yet been invented, but it would appear from the above opinions that this is an improvement over any other now in use. This new pavement is described at length in a paper read by Mr. Fred J. Warren, the patentee, before the recent meeting of the Boston Society of Civil Engineers. The paper is published elsewhere in this number. It is to be expected, of course, that Mr. Warren should believe in his own invention, but it is not reasonable to suppose that he is going to claim the impossible for his pavement and so destroy the good effect of a reputation as an asphalt and paving expert, which has been gained at the expense of twenty-five years of unremitting study and experience. It is well, however, notwithstanding the favorable criticism of Prof. Dow and others, for city officials to be conservative in their expressions and judgment. While the experts who have examined this pavement speak in the highest terms of the principles involved in its construction, and while its first year's use has shown no defects, it still remains a fact that the element of time has not been fully reckoned with. Five years' wear will supply the remaining evidence that is required to prove this pavement the best yet invented.

NATIONAL BRICK-MAKERS' MEETING

CLEVELAND, Ohio, Jan. 4, 1902.

Editor, MUNICIPAL JOURNAL AND ENGINEER:

The sixteenth annual convention of the National Brick Manufacturers' Association will be held in Cleveland the first week in February, 10th to 15th inclusive. A splendid programme has been prepared and a local entertainment committee arranged to give all members of the association and guests a good time.

The headquarters of the convention will be at the Hollenden Hotel, where an exhibition of brick-making machinery will be held. A novel feature of the convention will be a side exhibit of brick, assembled from all parts of the country.

The plans contemplate the annual dinner on Wednesday evening; an excursion to various brick plants adjacent to the city on Thursday morning, with the compliments of the Cleveland Hydraulic-Press Brick Company; a theatre party for the delegates and their ladies on Thursday evening, followed by smoker and social at the hotel for the gentlemen, aside from the regular business sessions of the convention, which will be of benefit to all members of the trade.

It is expected that this will be the largest and most enthusiastic convention ever held by the association.

E. W. ROBERTS.

Chairman Press Committee.

AMOUNT OF BRICK PAVEMENT IN UNITED STATES

INDIANAPOLIS, Ind., Jan. 9, 1902.

Editor, MUNICIPAL JOURNAL AND ENGINEER:

Dear Sir—We are in receipt of a letter from a subscriber asking for information relative to the approximate number of miles of brick pavement laid in the United States. We have kept no data of this sort. Have you? If so, will you kindly give me facts, or the address of parties who can. By so doing, you will greatly oblige.

T. A. RANDALL,

Editor, *The Clay-Worker*.

In the 159 cities having a population of 25,000 or over 1,184.84 miles of brick pavement have been laid. There are many cities of from ten to twenty-five thousand population which have brick pavements, increasing the amount by at least 10 per cent.

PERSONALITIES

—Mr. S. Bell, City Engineer of Webb City, Mo., has resigned his position.

—Mr. Henry Truelsen has been elected Mayor of Duluth, Minn., on the Democratic ticket.

—Mr. Hiram H. Woodburn has been elected an alderman in Binghamton N. Y., for a third term.

—The city of Auburn, N. Y., has a new City Engineer in the person of Mr. J. Walter Ackerman.

—By order of General Wood, Governor Nunez of Cuba has suspended Mayor Gener of Havana on charges of negligence made by all but five of the Councilmen.

—Mr. James Donovan has been appointed to the position of Superintendent of Streets at Boston, Mass., to succeed Mr. B. T. Wheeler, who recently resigned.

—In his annual report, Mayor Herman Myers, of Savannah, Ga., states that the city should not grant any more franchises to railways without receiving adequate compensation therefor.

—City Comptroller John R. Wolf, of Milwaukee, Wis., has been committed to the county insane asylum. The excessive use of alcohol and a complication of diseases are the cause of his insanity.

—On New Year's Day the "Hammer Club" of Jersey City, N. J., presented Mayor Mark M. Fagan with a floral hammer with the hope that His Honor would not fail to make use of it when occasion demanded.

—Dr. Edward Clark of the Health Department of Buffalo, N. Y., has been appointed to the position of Assistant Health Officer by Dr. Walter D. Greene, the Health Commissioner. Dr. Clark was formerly milk inspector in the department.

—At a reception tendered Mayor Jay B. Cline, of Syracuse, N. Y., by the Chamber of Commerce of that city, the former president of the Chamber, Mr. E. A. Powell, presented a loving cup of silver to President Francis E. Bacon, of the Board of Trade.

—The city of Oconto, Wis., has been presented with a public library by Mr. George Farnsworth. While not a resident of the city, Mr. Farnsworth feels grateful to Oconto because it was there that he laid the foundation of his fortune in the lumber business.

—The city of Buffalo, N. Y., has been presented with a fine "Zoo" by Mr. Frank H. Goodyear, one of its citizens. The donor will not spare any pains to make his gift as magnificent as is possible, and a committee has been inspecting zoological gardens in several cities to determine what is best to be done for Buffalo.

—Hon. Tom L. Johnson, Mayor of Cleveland, O., has proposed another scheme. This is to issue city stript, bearing no interest, but passing current, and to be accepted by the city and county for taxes. It is claimed that it is better than bonding. No doubt the National Government would have something to say about this scheme.

—Mr. Hezekiah Conant, the millionaire thread manufacturer of Pawtucket, R. I., has presented the village of Dudley, Mass., with a free public library building. This is not the first gift of Mr. Conant to Dudley, for when the village was swept by a serious fire some years ago, he rebuilt a church, library, observatory and other buildings.

—The Town Council of Hinkley, Ill., have voted to expel one of their number, John Mulroy, for conduct unbecoming an alderman.

Some of the charges in the indictment were "being contrary, talking too loud and long, and scoring the presiding officer." All his associates in the council voted to expel him. He will test the matter in the courts.

—Mr. George I. Bailey, C. E., has opened an office at 51 State street, Albany, N. Y., where he will carry on the practice of consulting engineer, making a specialty of water supply and sewage disposal. Mr. Bailey was the superintendent of the water works of Albany for ten years, and it was under his supervision that the present large and successful filtration plant was installed.

—The city of Palmyra, Mo., was recently deprived of the services of its City Attorney. Miss Mary A. Anderson was the former Attorney of the city, but Mr. Otho F. Matthews succeeded in persuading her to give up her chosen profession and to form a life partnership with him. She had the distinction of being the only City Attorney of her sex in the State. Her husband is a rising lawyer and her assistance will greatly aid him in his work.

—At a dinner given by the Get Together Club, No. 1, last month, the following speakers, all officials of New York City, addressed the assemblage: Hon. Homer Folks, Commissioner of Charities; Hon. John N. Partridge, Police Commissioner; Hon. Thomas Sturgis, Commissioner of the Fire Department; Hon. John G. Woodbury, Commissioner of Street Cleaning, and Hon. William C. Redfield, Commissioner of Public Works for Brooklyn.

—"Get Together Club, Number 2," gave one of its dinners at Kuenstler's Café, 51 Beaver street, New York City, on January 25th. State Senator George W. Plunkitt spoke on "How to Get Into Politics," Alderman Elias Goodman on "How to Stay in Politics," Hon. John T. Oakley on "How to Run an Assembly District," Mr. James B. Reynolds on "How to Be Useful in Politics Without Making It a Profession." The Hon. Jacob A. Cantor, president of the Borough of Manhattan, presided, and addressed the assemblage on "Practical Politics."

—Mayor John F. Hurly, of Salem, Mass., has been making things hum in that New England city. All custom has been thrown aside. He broke down all party lines, built a platform to suit himself, delivered his own speeches, and defeated in successive years men who trace their ancestry back to the Puritans. "Be popular and hustle" is his motto, and when elected he denounced the police force as dirty, undisciplined and a disgrace. Twice a year he gives every child in the city a theatre ticket. He is a hard worker, an inveterate smoker, but never touches liquor.

—Elections in Canadian cities resulted in the elevation to office of the following mayors: Toronto, Mr. Oliver A. Howland, re-elected; London, Mr. Adam Beck; St. Catharines, Mr. J. B. McIntyre; Hamilton, Major Hendrie; Kingston, Mr. J. M. Shaw; Brantford, Mr. D. B. Wood; Belleville, Mr. R. J. Graham; Guelph, Mr. John Kennedy; St. Thomas, Mr. S. Chant; Windsor, Mr. James F. Smyth; Niagara Falls, Mr. George Hanan; Niagara-on-the-Lake, Mr. James Atkins; Milton, Mr. S. Dice; Oakville, Mr. John Kelley; Kingsville, Mr. Elihu Scratch; Brockville, Mr. W. H. Harrison; Cornwall, Mr. W. J. Deruchie; Sault Ste. Marie, Mayor Thompson, re-elected.

—Hon. John R. Hinkle, Mayor of Columbus, O., has won his fight over the attempted impeachment proceedings by the city council. During a controversy last summer between the Mayor and the council, impeachment proceedings were threatened, and certain rumors were about to be investigated, when a friend of the Mayor filed an injunction suit to stop them. He brought the suit against the members of the council individually, and based it on a section of the statutes intended to prevent the misuse of public funds. While this was the excuse for the suit, the real question was whether the council had the right to bring impeachment proceedings. The Mayor held, through his friend, that the Probate Court was the only body that could impeach, and the trial judge rendered a decision in favor of the Mayor's contention.

ODD THINGS RELATING TO MUNICIPALITIES

"Officer Brady, the Modern Recruit"—Wedding Officials—Municipal Debating Society—A Village Spurns a Gift
—An Historic City Hall

"OFFICER BRADY, THE MODERN RECRUIT."—The following lines express very well the opinion prevalent in many persons' minds regarding the condition of the police force in New York City under Tammany Hall rule:

Sez Alderman Grady

To Officer Brady:

"G'wan! Ye 're no lady!

Luk here what ye've done:

Ye 've run in Red Hogan,

Ye 've pulled Paddy Grogan,

Ye 've fanned Misther Brogan

An' called him a 'gun'!

"Way up in Tammany Hall

They's a gintleman layin' f'r you!

'An' what, sez he, 't' 'ell, sez he,

'Does the villyun mane to do?

Lock up the ass in his shtall!

He'll rue the day I rue,

F'r he's pulled the dive that kapes me alive,

An' he'll go to the goats! Whurroo!"

Sez Alderman Grady

To Officer Brady:

"Where's Katie Macready,

The Confidence Queen?

She's niece to O'Lafferty's

Cousins, the Caffertys—

Sinitor Rafferty's

Steady colleen!

"Way up in Tammany Hall

They's a gintleman layin' f'r you!

'He's pinched,' sez he, 'an' cinched,' sez he,

'A lady tray comme eel foo!

Go dangle th' tillyphone call,

An' gimme La Mulberry Roo,

F'r the town is too warm f'r this gendarme,

An' he'll go to the goats, mon Dieu!"

Sez Alderman Grady

To Officer Brady:

"McCabe is afraid he

Can't open to-night,

F'r throuble 's a-brewin',

An' mischief 's a-stewin',

Wid nothin' a-doin'

An' everything tight!

There's Register Ronnell,

Commissioner Donnell,

An' Congressman Connell

Preparin' f'r flight;

The Dhistric Attorney

Told Magistrate Kearny

That Captain McBurney

Was dyin' o' fright!

"Oh!

'Way up in Tammany Hall

They's a gintleman layin' f'r you!

'Bedad!' sez he, 'he's mad,' sez he.

'So turnn on the screw f'r Bellevue,

An' chain 'im ag'in' the wall,

An' lather 'im wan or two,

An' tether 'im out on the Bloomin'dale route

Like a loonytick goat! Whurroo!"

—ROBERT W. CHAMBERS, in the *December Century*.

WEDDING OFFICIALS.—Among the attachés of the mayor's office in Binghamton, N. Y., are two officials not found in many other cities. These are an official bridesmaid and groomsman and, while the innovation is a novel one, it has been found very satisfactory. Their official duties consist of acting as witnesses for eloping couples, who go there to be married, and signing marriage certificates. Binghamton is a haven for eloping couples from Pennsylvania, who do not wish to go to the trouble of getting licenses and heretofore there has been great trouble in hunting up witnesses, especially when the parties were in a hurry to escape the irate parents.

MUNICIPAL DEBATING SOCIETY.—Something entirely new in municipal work has been started in the city of Glasgow, Scotland. This is a municipal debating society. While the organization will have no official status, it will embrace the leading men of all professions and businesses in the city. The object will be to discuss public questions, such as municipal improvements, taxation, health, workmen's homes, saloons, parks and theatres. Meetings will be held

once a week and a free forum will be offered for the discussion of all public matters. The society will recommend things, and its endorsements will be of great importance in future municipal actions.

A VILLAGE SPURNS A GIFT.—At a recent special election in the village of Greene, N. Y., the residents rejected three offers of Mrs. R. N. Moore, who had agreed to give a site for a \$20,000 school building, rebuild the Greene Novelty Works, which employed a large number of men, and endow a library given the village by her sons. After a hot campaign of over eight months, all these offers were rejected by the residents by a vote of 163 to 89. It was vigorously set forth by the winning side that it was detrimental to a community to accept donations, as there were always some conditions attached that rendered them hardships and that it encouraged a lot of persons to expect constantly further public bequests. Instead of accepting the free lot, valued at \$2,000, the voters determined to purchase one at a cost of \$4,000.

AN HISTORIC CITY HALL

PROBABLY no city in the United States has for its City Hall a building with which is connected so much history and romance as has the city of Yonkers, N. Y. Yonkers has done well to take this old manor house of the Philipse family for its municipal building, for it will thus be kept as a landmark of the old days, the relics of which are fast disappearing from the State. The respect for romantic history that has been shown in retaining the old building as far as possible in its original condition speaks well for a town that has not sacrificed all to business.

In the year 1655 Herr Van der Donck, one of the first of the Dutch settlers in New York, died in Amsterdam, and left to his wife his baronial estate at the colony of Colon Donck, now Yonkers. The property changed hands two or three times, and then became part of the Philipse estate. Frederick Philipse bought the property, and in 1693 this was erected, by royal charter, into a manor under the name of the Manor of Philipseborough. Eleven years previous to this he had erected what is now the City Hall at Yonkers. The Manor House at Philipseborough, where Philipse, as the first lord, resided, was a pretentious affair for those days; large rooms, richly ornamented ceilings, and a broad hall with a staircase imported from England. The door that still swings on the southern side was made in Holland, and imported in 1681 by the first wife of the lord. A lawn sloped down to the edge of the Hudson, and as dotted with trees and shrubs brought from foreign parts; deer ran in the park and a retinue of fifty slaves was needed to keep the estate in order. In 1702 Frederick died, leaving the estate to his nephew, also Frederick Philipse, who became the second lord of the Manor. The house was now enlarged to thrice its

former size by adding the eastern front. Two entrances with columns were built and the roof surmounted with a heavy balustrade, from which a magnificent view of the Hudson could be obtained. The house was elegantly fitted with English mantels, superb staircases, and in the gable roof were built dormitories for half a hundred servants.

On the death of the second lord of the Manor the estate passed to his son Frederick, but in 1779 his vacillatory conduct between the American and royal causes, ended in his being declared a traitor by the State of New York, and his estate confiscated. In 1784 the State

offered it for sale and the Manor and surrounding lands were purchased by Cornelius P. Low, of New York, and became the rallying spot of the village of Yonkers. Low did not occupy the Manor himself and soon sold it. It had many owners up to 1813, when it fell into the hands of Lemuel Wells, who lived there until 1842. At his death the estate was divided among his heirs. In 1867 the village of Yonkers bought the house, and in 1872 made it the City Hall. In fitting it up as the official home of the city as few changes as possible



PHILIPSE MANOR HALL, NOW USED AS CITY HALL

ble were made. The old panel work was left on the walls and the decorated ceilings were only painted. In remodeling the upper floors to make room for a council chamber the beams removed were made into desks for the officials. From an old chest found in the house was made the mayor's chair. In the attic the doors still swing on their wooden hinges, and the rooms have been left as in Revolutionary times. The southeastern chamber still has its huge fireplace of bricks from Holland, and from it leads a secret passageway to an underground retreat.

CURRENT NEWS AND PRACTICE AMONG THE CITIES

Use of Oil on Clay Roads—Municipal Lodging House—Smoke Abatement—Three-Cent Fares—Successful Municipal Lighting Plant—Water Supplies of Towns and Cities—Prosperous Belgian City

HOT WATER TROLLEY HEATING.—One of the trolley lines in Hoboken, N. J., has installed a system of heating its cars and have found it to give better service than even the electric heating apparatus formerly in use in its cars. The stove that heats the water is entirely concealed under the seats.

BOSTON'S PUBLIC BATHS.—For the first ten months in 1901 the total number of bathers at the six public baths in Boston, Mass., amounted to 494,624 of both sexes, the greatest number being in March (57,478) and the least in February (40,592). Of this total there was an average of three males to every female.

MACADAMIZED STREETS.—At Wyoming, O., the cost of macadamized streets has been about forty-four cents per square yard on twenty-eight streets with an aggregate length of 53,007 feet. A total of 18,316 cubic yards of broken stone and screenings were used at an average cost of \$1.90 per yard, the average depth of the broken stone when loosely spread being six inches.

VEHICLE TAX.—The city of Columbus, O., has adopted a tax on all vehicles including street cars. The money is to be used for improving the streets and the city authorities have calculated that all street improvements can be paid out of this tax. In Toledo, O., the city taxes street cars \$15 a year and trailers \$5, and the taxes on other vehicles run from \$1 to \$5 according to their character and size.

GLASS PAVEMENT.—A street in Paris, France, that has been opened to the public is paved with glass. It was thought that the surface would be slippery, but on the contrary it has proved to afford an excellent foothold for horses, and will not become dusty or absorb filth. All kinds of glass debris was utilized in the manufacture of the pavement, and the inventor of the process is sanguine of its adoption on a large scale.

TO VACCINATE THE CITY.—The Board of Health of Philadelphia, Pa., has issued a notice to householders to the effect that physicians duly qualified by the city will call from house to house to vaccinate the inmates. There will be no charge in any way to the persons so treated as the city will bear the expense. The people are asked to co-operate with the city in the matter in affording a greater protection to the public health.

TELEPHONES MUST GO.—The City Council of Wichita, Kan., has passed an ordinance which will drive the Missouri and Kansas Telephone Company out of business. After September 1, 1902, a fine of \$100 must be paid by the company for every pole left standing or for the erection of any new poles without the consent of the Mayor and Council. It is needless to say that the company will test in the courts the legality of the ordinance.

STREET SIGNS NUMBERED.—The officials of New York City have been discussing the installation of street signs on a uniform plan and many designs have been suggested. One suggestion is that in addition to the signs telling the names of the streets that they also tell the number of the house nearest the corner and in what direction the numbers increase. This could be done by placing a plus sign on the side of the number and in direction of the increase.

HAVANA CONTRACT.—The contract for sewerage and paving Havana, Cuba, for \$10,649,000, was awarded some time ago to McGivney & Rokeby, of Jersey City, N. J., and has been signed by the firm and Acting Mayor of the city. The work must be finished in four years and will be started within thirty days after notification by the city. If the notification is not given within sixty days the contractors are to receive 3 per cent. interest on the money deposited.

ROADS IN JERSEY.—The annual report of Road Commissioner Rudd shows that the total mileage of macadam roads in the State is 109,376, and the cost to the State was \$149,850, or with local aid, \$449,550. Plans are on foot for the building of roads that will total \$472,700. Essex county received the largest share of nearly nine and one-half miles, while Sussex received the least, or 6.89 miles. Only two-thirds of the counties of the State took advantage of the appropriation.

TO STOP ALL SMOKE.—The city authorities of Indianapolis, Ind., have notified the State authorities that the ordinance against allowing black smoke to issue from chimneys must be obeyed by the institutions of the State as well as by private parties. A notice to the same effect was also sent to the county commissioners. The mayor's declaration against the smoke nuisance is having good results in the number of smoke consumers that are being placed in many large buildings and factories.

MANY STREET NAMES ALIKE.—Much confusion is caused strangers in the city of Richmond, Va., because of the fact that there are several streets of the same name. Another pernicious practice that is not confined to Richmond, is having what is really the same street bear several names at different intervals of its length. In Richmond there are two Baker streets, two Graham streets, three Cedar streets, etc. There are also some streets which differ in name by a single letter, such as William and Williams streets.

AIR IN THE PARIS UNDERGROUND.—In answer to complaints made by travelers in the underground railroad in Paris, France, experts were retained to investigate the air, and have reported that, as regards atmospheric conditions, the air is as pure in the underground as in the streets above. There was no carbonic acid gas, and the quantity of oxygen was normal. In connection with this topic, it may be mentioned that the court has decided that the Metropolitan Underground Railway cannot prohibit people from smoking as the road is a tramway and not a railroad.

CHEAP TELEPHONE RATES.—The Telephone Company of America has offered the city of Utica, N. Y., what is no doubt the best return for a twenty-five years' franchise that any city has yet received from any telephone company. The company will install a telephone instrument in every house in the city where such is wanted and charge a uniform rate of two cents for a five minutes' conversation. There will be no charge for instruments and none for messages received. Any merchant that needs more than one phone can have as many telephones as he wants without extra charge.

BICYCLING IN VIENNA.—Vienna has the severest cycling code of any city in Europe. No one may ride a bicycle in the streets without certificate of proficiency. Ladies must be able to mount and dismount from both sides of their wheels, show that they can turn corners and ride in and out between a number of dummies. All cyclists are photographed by the police, and this photograph is fitted into a little book containing the rules for cycling in the city. For this book the cyclist must then pay five shillings. Besides this a huge brass number has to be worn conspicuously placed on the handle-bar of the machine.

AUTOS IN PARKS.—The Park Commissioners of San Francisco, Cal., have been causing the owners of automobiles much worry because of the restrictions that have been placed on the use of their machines in the parks. President F. A. Hyde, of the Automobile Club of California, made an extensive trip through the principal cities in the country and found that San Francisco was the only large

city in which automobiles are not afforded equal privileges with other vehicles. It has been proposed that all automobiles should be licensed, but that chauffeurs need not pass an examination as to their ability to run the machines.

THREE-CENT FARES.—About a year has passed since Hon. Tom L. Johnson, Mayor of Cleveland, O., made a speech advocating a three-cent fare on the railway lines of his city, and now the Council has passed an ordinance providing for that fare on all the lines in the city after the charters of the companies have expired. The ordinance was passed unanimously and is a complete victory for Mayor Johnson. Under an ordinance adopted last year the Columbus (O.) street-car lines sell seven tickets for a quarter of a dollar with universal transfers and the council in Akron, O., has refused a franchise to a railway unless a three-cent fare is given.

MUNICIPAL LODGING HOUSE.—The very latest thing that the city of Chicago will do in the way of municipal ownership is the establishing of a lodging house where honest men, who need a bed and food and tramps and loafers who apply at the station houses for shelter can obtain a warm bed. All must go through a test as to cleanliness and a medical examination before they will be allowed to stay. An employment bureau will be opened, and whenever men are wanted, the managers of the lodging house will try to get their lodgers accepted. The City Council has appropriated \$10,000 for the purpose, and the house secured will accommodate 300 men.

SALOON REGULATION.—The City Council of Augusta, Ga., has passed a couple of ordinances relating to bar-rooms. Hereafter it shall be unlawful for any liquor dealer or his agent to allow drunken or disorderly persons to assemble in his place of business and any person violating this ordinance shall be fined not more than \$100 nor be imprisoned or labor on the public works more than ninety days. No girl or woman shall enter any bar-room where there is no grocery attached, for the purpose of purchasing liquor, or loitering therein and no liquor dealer shall permit any woman to enter. Any one violating this ordinance shall be punished as in the foregoing ordinance.

COOKING CLASSES FOR PUBLIC SCHOOLS.—The committee of the school board on manual training of Milwaukee, Wis., is heartily in favor of continuing the classes in cooking for the girls. As the boys receive training in manual arts it is thought no more than right that the girls should be taught how to make good things for the home table. In fact, it is contended that good cooking is as necessary to a housewife as is book knowledge. The weak spot in the present system of admitting girls to the classes is in the fact that only such girls as shall reach a certain standard in their studies shall be allowed to attend the classes. The directors think that dull girls need this training more than do bright ones, who would learn quickly outside.

SEWER SYSTEM OF NANTES.—Less than half the city of Nantes, France, is sewered but work has been begun on a complete system and it is expected that this will prove adequate to the needs. Some years ago a Marseilles company offered to build a system of sewers for \$3,860,000, but the offer was rejected as too expensive and the city has agreed to do the work. The main collector will pass through the city along the right bank of the Loire River and its dimensions will be 86.6 by 51.18 inches. There are to be four secondary collectors, 78.74 by 39.37 inches in diameter. The material used in construction will be stone and brick laid in cement. The combined length of the city's streets that are in need of sewers is about sixty-two miles, and there are twenty-five miles of old sewers in the place. When the suburbs of Dulon and Chantenay are annexed, the population will be about 200,000.

BEST OIL FOR ROADS.—Mr. Eldridge, assistant director of the Department of Good Roads Inquiries, Washington, D. C., has made

some interesting statements in regard to the kind of oil that will give the best results for road sprinkling. He says that the proper oil to use is what is known as the residuum oil, which is usually discarded as useless. It has considerable body to it, and when sprinkled on the road, consolidates with the dust particles, forming a crust on the surface resembling leather, which is almost impervious to water. On sandy soil this treatment will not help matters at all. When the oil is properly applied, the surface should last for a year. Kerosene or petroleum should never be used, according to Mr. Eldridge, on account of their volatile nature. In Pensacola, Fla., a fund was made up for the purpose of purchasing a quantity of the crude oil from the Texas oil fields, and the first consignment of the oil, when placed on the streets, proved such a satisfaction to the people that much more has been ordered.

NEED PROPER HOUSE NUMBERS.—The city of Schenectady, N. Y., is badly in need of a uniform system of house numbering. In some of the streets houses on one side are a hundred numbers higher than those opposite, some houses have the same numbers and an endless amount of confusion is caused to merchants in delivering goods. An ordinance has just been passed in Harrisburg, Pa., ordering the city engineer to renumber all the houses on a uniform plan and furnish to householders correct numbers for their houses in accordance with such plan. The owners are given thirty days to place the numbers in a conspicuous place on the house under penalty of a fine of not less than \$5 nor more than \$10, and in case of failure to obey the number shall be affixed by the authorities. A similar ordinance has gone into effect in South Portland, Me., where only forty-eight hours were given the owners to place the proper number on the house so as to be plainly seen from the street, but the fine ranges from \$1 to \$5.

IMPROVE THE CITY.—A council of women's clubs has been held in Duluth, Minn., and a movement has been started to better the condition of the city from the standpoint of cleanliness. The women will try to arouse a spirit of enthusiasm in the citizens and officials. The women of Montclair, N. J., have begun such a movement and have accomplished more in six months than has ever been done before. The enlistment of the children of a town or city in this work goes a great ways towards accomplishing the desired object as has been demonstrated in Allentown, N. J., and other places. A league was formed and prizes were offered for clean back yards and alleys. The boys and girls were taught to pick up papers and such things from the streets and to keep the vacant yards clean. The Rev. E. I. Stoddard, of Jersey City, N. J., is training 1,000 children to assist the city authorities in keeping the streets clean, following Colonel Waring's example. He lectures them frequently and urges them to be careful not to litter the streets and to see that their playmates and parents do the same.

SMOKE ABATEMENT.—Four cities in the United States are taking means to end the unnecessary pollution of the air of the cities by smoke. In Indianapolis, Ind., every day complaints are filed against buildings violating the smoke ordinance and the smoke inspectors are on the alert to add more to their list. The Municipal Art Society of Baltimore, Md., have been trying to have an ordinance passed compelling all establishments using soft coal to use smoke consumers. The committee of the Common Council having the matter in charge has determined to report favorably the ordinance to the Council. Any kind of coal can be used in the city so long as no dense, black smoke is emitted from the stack. The Board of Councilmen of Louisville, Ky., has passed an ordinance requiring the use of smoke consumers. The penalty for allowing the emission of dense smoke from a factory, dwelling or other building is a fine of not less than \$10 nor more than \$50. The Health Department will give the offenders thirty days' notice and then will issue warrants. In Cleveland, O., good work has been accomplished in abating the smoke nuisance and railroads, factories, etc., have been watched and notes taken of the amount and character of smoke issuing from their smoke-stacks. The outlook is very promising.

USE OF OIL ON CLAY ROADS.—An experiment for the purpose of testing the efficiency of oil on a clay road was recently made on a "buckshot" road near Clarksdale, Miss. The buckshot is a tough black clay and a very poor road material. In the experiment the road was first shaped with a road machine and then well rolled with a five-ton roller. Water was then sprinkled on it to mould together the small particles of clay on the surface. The road was allowed to dry in the sun for several days, when a layer of coarse sand, one-quarter inch in depth, was spread over the surface and another layer of finer sand placed on this. Oil was sprinkled on this with an ordinary street sprinkler, and five days afterwards the five-ton roller was passed over it three times. Further rolling was done a few days later. As the time of year was such that the temperature of the air was not hot enough to dry out the more fluid part of the oil and harden the surface, the experiment was not the success expected. It was found that the best time to oil the road was in the spring, when the surface is hard, and after the oil has been evenly distributed, to roll it thoroughly. It was also found unnecessary to apply the sand, which was put on to roughen the surface, as the oil was readily absorbed by the dry buckshot and did not run at all.

NEW OFFICIALS AT KNOXVILLE.—The biennial municipal election for the city of Knoxville, Tenn., was held Saturday, January 18. It was the first time in the history of the city that more than one candidate was not in the field for mayor and that more than one full ticket was not out. The democratic party had a full ticket in every ward, but with the exception of two independent candidates for chairman of the Board of Public Works, and three independents for associate members of the same board, and six independent candidates for aldermen, there was no opposition to the full democratic ticket that was elected. The new officials, all of whom will be sworn in next Saturday, January 25, are: Mayor, Mr. J. T. McTeer; Aldermen, Messrs. Robert McMillan, H. M. Aiken, Walter Bell, A. S. Birdsong, W. H. Kephart, Sam E. Cleage, W. C. Sanders, John P. Murphy, T. F. Ward, George A. Gammon and A. J. Miller; Chairman of the Board of Public Works, William Epps; Associate Members Board of Public Works, Herbert W. Hall and Samuel Harbison. All are elected for two years except Chairman Epps, whose term is four years. The Board of Public Works has charge of all public improvements, street, sanitary, fire and police departments, etc. The Mayor and Aldermen constitute the executive board. The new administration proposes to make extensive improvements in so far as funds will permit. It takes charge without a floating debt being handed down from the last administration. Two years ago the outgoing administration left an enormous floating debt. This has been liquidated, all running expenses paid and some improvements made by the outgoing administration, at the head of which was Hon. S. G. Heiskell as Mayor. All the officials-elect were members of the last administration except Mayor McTeer, Aldermen Ward and Sanders and Board of Public Works member Hall. This is a guarantee of a continuance of good government.

A SUCCESSFUL MUNICIPAL LIGHTING PLANT

AFTER many attempts on the part of prominent citizens of Wallingford, Conn., to secure a municipal electric lighting plant, in the fall of 1898, a committee of five gentlemen was appointed by the Court of Burgesses to investigate the probable cost of a lighting plant suitable to the needs of the borough. After consultation with expert engineers and after mature deliberation, a report was prepared in detail, covering a model plant with plans and estimated cost of construction. At a special meeting of the borough, held January 23, 1899, the report was accepted and a resolution adopted, after much discussion, that the borough proceed to construct the plant as planned. The price of the plant was placed at a maximum of \$40,000, and an issue of \$45,000 3½ per cent., twenty-year bonds was authorized for the necessary funds. The contract was let to the Hyer Sheen Electric Motor Company, of Newburg, N. Y., at \$39,640, and was carried out under the supervision of Engineer Thomas C. Perkins on behalf of the borough. On February 20, 1900, the plant, which had been in actual operation since January 1, 1900, was turned over to the board of electrical commissioners, which had been deputed by the borough to take charge of it.

The power house is so situated that an ample supply of water is at hand. The house itself is a brick and iron building, divided into three sections, or rooms, by brick partitions. These rooms are boiler room, engine room and superintendent's office, with work room, toilets, etc. The whole building on the outside measures 104 feet by 45. Coal bunkers, with a capacity of 325 tons of coal, are situated close by the power house. The steam plant consists of two 150 horse-power high pressure horizontal boilers, two Corliss self-oiling engines of 150 and 300 horse-power respectively, one vertical type condenser, one main and one auxiliary feed water heater, pumps, etc. The electrical equipment of the plant consists of one 150 kilowatt, or 3,000 light alternating current dynamo, and one of seventy-five kilowatts. There are also exciters, switchboard and other necessary apparatus. For the street arcs the current is furnished by three tub transformers which give a constant current of 6.6 amperes. The station is so arranged and wired that an additional engine can be added and the output of the plant about doubled. All water used passes through a meter, and all coal is weighed and an accurate account is kept of everything that is employed in running the plant.

Great satisfaction is found with the alternating system of enclosed arcs, and they require trimming only once in every ninety hours as against seven to twelve hours with the open arc. Incandescent lights are furnished for commercial lighting on a sliding scale of flat rates at so much per month for each lamp according to the number of hours used each night. This makes a change of about one-half a cent per hour for an incandescent lamp. When a meter is used the customer advances the cost of the meter and the rate is 10 cents per kilowatt. All wiring inside buildings must be done by outside parties, the borough bringing the service wires to the outside of the building free, if not more than fifty feet from the curb line. The first installation of lamps is furnished free, and after that they

LICENSE FEES CHARGED AND AMOUNTS COLLECTED IN FIVE CITIES

Description.	New York.		Chicago.		Philadelphia.		St. Louis.		Boston.	
	Amount charged.	Amount collected.	Amount charged.	Amount collected.	Amount charged.	Amount collected.	Amount charged.	Amount collected.	Amount charged.	Amount collected.
Circus			\$300 per day				\$300, 6 days		\$500.00	
Billiards, per table, per year...	\$3.00	\$795.00	10.00	\$2,227.64			10.00	\$704.55	2.00	\$2,744.00
Bowling Alleys, per year.....	5.00	60.00	10.00	1,701.04					2.00	
Dogs			2.00	86,856.00			3.00	2,540.99	2.00	21,849.40
Gunpowder and fireworks.....			25.00	447.92	\$5.00	\$10.00			1.00	1,279.00
Hawkers and peddlers, foot....			10.00		8.00		10.00			
Hotel and railroad runners....	20.00	620.00	12.00	362.00			50.00	299.20		
Intelligence office	25.00	2,275.00			50.00	4,400.00	300.00	1,302.75	50.00	3,400.00
Junk dealers	20.00	4,100.00	50.00	7,412.61			50.00	2,630.11	5.00	
Pawn brokers	500.00	88,000.00	300.00	20,775.00			200.00	5,220.00	50.00	3,500.00
Saloons	state lic.	5,674,710.46	500.00	3,174,003.42	1,103.75	1,715,141.25	500.00	1,001,573.05		
Scavengers and vault cleaners.			5.00	1,891.20	50.00	1,150.00	100.00	195.00		
Second hand dealers.....	25.00	3,900.00	50.00	8,839.67			25.00	66.28	5.00	740.00
Shooting galleries	5.00	145.00	10.00	174.18						
Street cars, per car.....		73,640.00	50.00	105,058.00	10.00	942.00	25.00	20,572.50		
Hacks, public			5.00	2,832.95			5.00		1.00	1,800.00
Hack drivers50	574.00	2.50						.50	672.50

In Chicago, butchers pay a fee of \$15 and hospitals \$10, milk dealers, \$10. Photographers in St. Louis pay a fee of \$25. Pool tables are taxed \$10 a year in Chicago and \$2 in Boston. In Philadelphia street cars with one horse pay \$25 and with two horses, \$50. Street stands in New York pay different amounts, according to their use, ranging from \$1 to \$25. Chicago taxes bootblack, fruit and flower stands for "street privileges," varying from \$3 to \$15 per month, according to size and location. Chicago also taxes undertakers \$50. Public carts, cabs and coaches pay fees of from \$1 to \$5 in New York and stages are taxed \$20. St. Louis taxes bicycles \$1, and collects \$3,873.69. Omnibuses are taxed \$5 in Chicago and \$100 in Philadelphia. Hotels and boarding-houses pay a fee of \$2 in Philadelphia. St. Louis collects 50 cents for each room for lodging-houses, but nothing less than \$2.50.

are charged at cost. Wiring must be done according to strict rules of the commissioners.

Under the laws of the State the municipality is required to raise by taxation for the electrical department a yearly sum equal to the actual cost of maintenance of the system, the cost to include all proper charges, including depreciation at the rate of 5 per cent. per year. Thus, the larger the output for commercial lighting, the cheaper will be the cost of street lighting.

The working force of the plant consists of a superintendent, two engineers and one lineman, who also does the trimming. On November 1, 1901, there were connected in the commercial system 5,381 sixteen candle-power lamps, supplying 256 consumers, and being lighted an average of fourteen hours per night. The street lamps are lighted at dusk and burn until 1 A. M., except on special occasions, such as the night before the Fourth of July, when the safety of the borough requires it; they are then lighted until daylight. When the moon furnishes sufficient light for the streets, the lamps are not lighted. The average rate of the candle-power per lamp is 1,200. Three of the street lights are on the commercial circuit, and are controlled by automatic time switches which light them at dusk and extinguish them at dawn. The street lights are placed at an average distance of 500 feet apart. The total number of watts output for the year 1901 was 223,597.5, or an average per pound of coal of 108.41. The average number of pounds of coal burned per kilowatt was 9.22, and the average cost per kilowatt for fuel was \$.0188.

For the year 1901 the assets of the plant were \$62,546.25, the liabilities \$58,875.89, leaving a surplus of \$3,670.36. For the coming year, 1902, it is estimated that it will be necessary for the borough to appropriate \$20,832.82 to carry on the plant. Of this \$5,040 is for fuel, \$1,917.90 for labor, \$300 for maintenance of arc lamps, and \$544.63 for repairs on plant and equipment, being 1 per cent. of the cost of the plant.

A PROSPEROUS BELGIAN CITY

A MEMBER of our staff having visited Liege, gives the following information, which is interesting for comparison and encouragement of cities of the United States. Liege has 171,000 people. Deducting its death rate of fifteen per 1,000, or 1½ per cent., the growth of the city is 10 per cent. annually. Its debt is \$17,260 at 3 per cent. Last year, its surplus above expenses was \$104,400. The city pays pensions to old employees of every department, their widows and young orphans. Last year the pension roll included 217 persons. The total pension list is about \$33,500, an average of \$154 per person per year. The individual amount varies with the standing of the deceased official.

The city maintains hospitals, an art gallery, museum, parks, and other institutions. One department is worthy of special notice. It is the "public pawn bureau," managed by trained employees. It is of great benefit to the poor. The loans being made as near cost as is safe for the city. The rate seldom exceeds 5 per cent. per year, as compared with 20 to 60 per cent. rate taken by American pawn-brokers. The total loans and expenses—also the receipts balancing them—last year were about \$250,000. At the end of the year there were stored in pawn 56,122 articles representing \$133,000 outstanding loans.

The public schools are well built and administered. They contained last year 22,450 scholars, in primary schools, middle schools and schools giving practical education, including industrial, trades, machinist, horticulture, tanning, business, stenography, typewriting, modern languages. Other schools worth noting are those for house-keeping and cooking; especially valuable for the working classes. Special excursion classes to gardens, farms, factories, etc., are made. The summer vacation classes in small groups, to many parts of the country, and especially the summer colony schools for boys and girls separately, are interesting features.

The school baths, in the form of swimming pools, warmed in winter, are made obligatory for public school teachers. The children are divided by ages into three grades and then into groups. The boys and girls use the baths on alternate days, so that each pupil has a swim twice a week. The public school scholars' savings account is also successful. There are 10,057 deposits ranging from a few cents to several dollars each. The total deposits during last year amounted to \$15,040.

In addition to the public schools the city maintains a university with several faculties, embracing the principal higher studies and professions. The 1,490 students are not included in the number given for the public schools. They come not only from Liege and Belgium but from twenty-nine other countries of the world.

In regard to the police and public order, it is interesting to note that the force consists of 292 men, under a chief. There are no commissioners.

The suppression of superfluous dogs and cats and elimination of danger of hydrophobia is shown by the fact that 1,362 were caught, of which 267 were reclaimed by owners and the balance asphyxiated with coal gas. There were found only six cases of animal rabies during the year.

It regard to the water supply, it is instructive to note that every consumer is metered. The consumption for all uses is less than twenty gallons per inhabitant per day. This includes public fountains, commercial and private uses. The meters show that domestic consumption is at about seven gallons per person per day. The charge is a little less than 10 cents per thousand gallons—about one-half cent per barrel. The total receipts for water were \$74,113 and expenses only \$28,122. Few cities can show such low rates and large per cent. of profits. This department is managed by a chief engineer and forty-four men, including office help, field force and laborers.

WATER SUPPLIES OF TOWNS AND CITIES IN TEXAS

	Population, 1900.	Ownership.	Source of supply.	Daily average consumption, gal. lons.	Pressure, pounds per sq. in.	Miles of mains.	House connections.	Cost of works.	Cost of maintenance.	Sewers.
Abilene	3,411	P	I	700,000	70-130	14	650	\$125,000	\$8,000	N
Baird	1,502	M	W		88	1½		10,000	420	N
Ballinger	1,128	M	Sr			1½		20,000	1,200	N
Cameron	3,341	P	R	500,000	45	5	300	40,000	700	N
Cisco	1,514	P	Sr	120,000		4	200	94,000		N
Cleburn	7,493	P	W	500,000	36-100	25	1,775	150,000	9,100	SS
Colorado	1,874	P	W	75,000	50-93	7½	175	40,000	2,000	N
Corsicana	9,313	P	W	500,000	50-100	11	500	120,000	12,500	SS
Cuero	3,422	M	R	400,000	45-100	7	700	47,000	3,000	N
Dallas	42,638	M	R	4,500,000	60-85	96	5,000	1,250,000	26,000	SS
Decatur	1,562	P	W	40,000		2½	150	21,765	1,200	N
El Paso	15,906	P	W	1,500,000	75	12	2,000	200,000		SS
Ferris	904	P	W	10,000	40	2		20,000		SS
Fort Worth	26,688	M	R	3,200,000	80-125	55	3,200	1,100,000	25,000	S
Gainesville	7,874	P	W	400,000	60-125	11½	750			SS
Galveston	37,789	M	W	2,100,000	58-90	49	3,760	1,400,000	30,500	SS
Giddings	1,278	P	W			2	60			N
Greenville	6,860	P	R	220,000	55-125	8	475	175,000	4,500	S
Groesbeck	1,462	M	R & Sp	50,000	40-80	7	25	12,000		N
Henrietta	1,614	M	W	50,000	110	4	100	17,000	720	N
Hico	1,480	M	W	10,000	50	¾	100	7,500	600	N
Itasca	1,277	M	W	100,000	120	6	300	20,000	900	N
Ladonia	1,409	P	Sr	10,000	35-75	2	25	12,000	1,200	N
Lampasas	2,107	P	Sr			3	200	45,000		N
Llano	1,462	P	Sr	500,000	45	12	200	20,000	1,000	N
Mexia	2,393	P	Sp & W	35,000	40	5	463	40,000	2,100	N
Navasota	3,857	M	W	100,000	44-100	1½		18,000		N
New Braunfels	2,097	M	Sp	350,000		0	351	55,000	2,700	N
Palastine	8,297	P	Sp	750,000	50-68	16		147,000	6,000	SS
Rockdale	2,515	P	W	150,000	45-80	4	30	40,000	2,750	N
San Antonio	53,321	P	W	9,000,000						SS
San Marcos	2,292	P	Sn	1,000,000	60-120	18	357	135,000		N
Smithville	2,577	P	R	125,000	45-80	4¾	200	25,000	6,720	N
Stevenville	1,902	M	W		35-100	¾	20	2,500	500	N
Taylor	4,211	P	R							N
Temple	7,065	P	R			8	2,500	65,000		N
Terrell	6,330	M	W					50,000	500	N
Victoria	4,010	M	R	300,000	40-100	10	350	70,000	3,000	N
Waco	20,686	P	W	4,000,000	45-80	80	5,000			SS
Yoakim	3,499	P	W	300,000	40-120	10½	450	90,000		N

P Private. M Municipal. I Impounded. W Wells. Sr Surface. Sp Springs. R River. N None. S Sewers. SS Separate system. (From a report of a special committee of the Merchants' Association of New York.)

THE FIRE DEPARTMENT OF HAMBURG

A Force of 500 Men—Roomier Houses Than in the United States—Low Cost of Maintenance as Compared with Departments on This Side—Some Interesting Regulations

By Our Special Correspondent

It is a difficult thing to compare closely the fire departments of Europe with those in the United States because of the widely different conditions in the two continents. The best one can do is to present the foreign departments as they are and allow comparisons to be made on any lines that may admit of a fair analogy.

The fire department of Hamburg, Germany, is not the best department in Germany, according to the chief of that department, but it is

a good one nevertheless. Hamburg being a state in itself, the department is under its control, and the state pays about four-fifths of the cost. In the year 1894 the total cost of running the department amounted to \$209,699.63, or a per capita charge of a little over 64 cents. Let us see how this compares with some of the other big cities in the world. New York, with its 3,427,202 people, spends \$5,802,809 on its fire department, making the per capita charge of \$1.69. Chicago spends \$1,617,225, or \$.95 per person.

Cleveland's department costs \$455,739, which makes a per capita rate of \$1.19. Buffalo has a population about the size of Hamburg, which is 323,729, and her department costs \$1.86 for each member of the community, or \$658,541 per year. The city of Pittsburg, with a population several thousands smaller than that of Hamburg, pays \$501,554 per year for fire service, or \$1.55 per capita. The maintenance of the London, Eng., fire brigade in 1900 amounted to \$992,772.62, which made a per capita expense of \$.218. Of course, it must be taken into consideration that these several cities have widely divergent conditions in their fire service that would account for the difference in the cost of maintaining the same. Thus the departments in American cities must keep up a much larger and more expensive force than those across the water on account of the less fire-proof conditions of the buildings in America. The salaries of the American firemen are very much higher than are paid to the German and English laddies, but it may be stated as an offset to this that the English firemen and their families are housed in the engine houses

or adjoining quarters, and this would increase the expense very considerably.

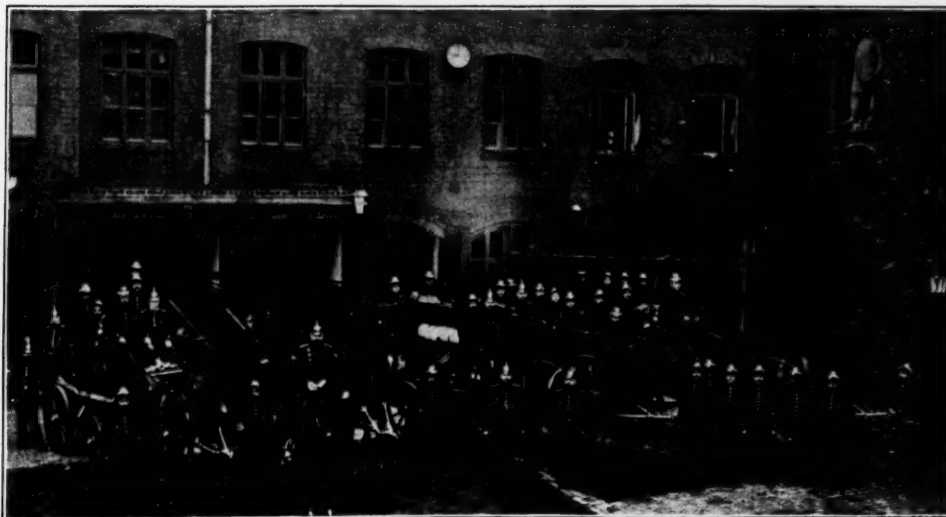
The effectual force in the department was about 500 men composed as follows: One chief, a deputy chief, eight district chiefs and two assistants, a drill-master, thirty-eight captains, twenty-seven engineers, 405 firemen, fourteen telegraph operators, one quartermaster, a machinist, and five clerks in the bureau department. The apparatus consists of six large steamers, thirteen smaller ones, seven gas engines, thirteen fire-boats, nine mechanical ladders, nine wagons for carrying firemen, nine tool wagons and 109 other pieces of apparatus on wheels ready for use. The department has an improved door-opener that is guaranteed to open any door except that of a safe. It is about three feet high and works like a jack. It has a steel bar, one end of which rests on the ground and the other against the door. A lever slides on this bar and forces the door open. The appliance is operated very quickly and easily, and is strong enough to lift a heavy truck in the air.

Like the engine houses in Berlin, those in Hamburg are much roomier than those in the United States and much more apparatus can be placed on the floor. In the new house in the city besides the usual sliding poles, and between the large double stair-case, there is a large chute about eighteen inches wide. When the alarm is given, some of the men take to the poles, some run down the stair-case, while the others throw themselves on their backs on the chute and slide down feet foremost. The usual time for the men to get down to the lower floor is about twelve seconds, and the apparatus is out of the house in ten more. At night they can get out inside of thirty-five seconds. The fireman in this city has to be on duty twenty-four hours and then receives twenty-four hours off, but while on duty he must not leave the engine house for any reason whatsoever. He must sleep and eat there, but his accommodations are of the best and his meals good. Friends are allowed to visit him at the engine house and very often the rear of the house is fitted up as an arbor where the men can receive their friends and drink a glass of beer with them.

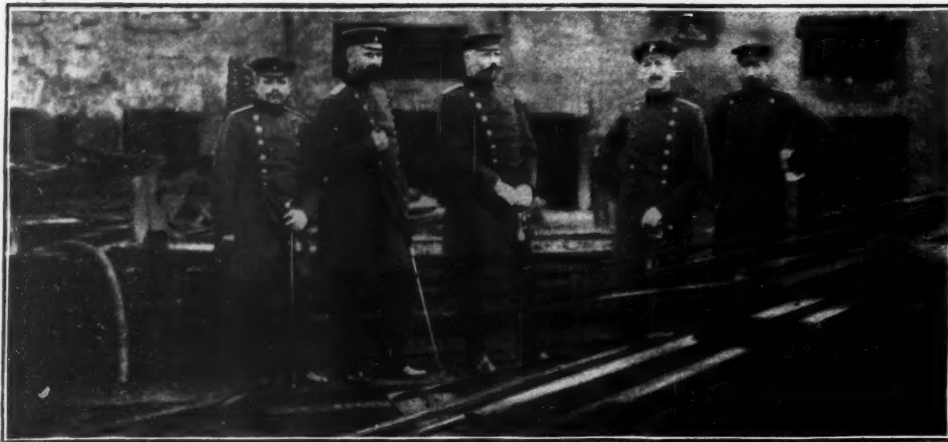
The work begins at half-past five in the morning and the first hour is left free for dressing and the cup of coffee that all take at that time. Then an hour is devoted to cleaning up the living rooms. At about eight o'clock the roll call takes place and then breakfast is served. From eight-thirty to eleven-thirty, the men are drilled and instructed in their duties. After this, until two o'clock, the men have a chance to rest and eat their dinner. Instruction in the School for



CHIEF WESTPHALEN, HAMBURG



HAMBURG FIREMEN, APPARATUS AND STATION



CHIEF WESTPHALEN AND ASSISTANTS, HAMBURG

Firemen takes place from two to four, followed by their afternoon coffee. From four-thirty to five-thirty the men are again drilled and have gymnastic exercises. A general cleaning up then takes place for the night. On Fridays the bed clothes and bed-rooms are aired and cleaned, and on Saturday the entire quarters are scrubbed. This takes place at the usual hour for gymnastics, and in the winter these drills and gymnastics are replaced by instruction in the School for Firemen.

On water as on land, the department is ready to cope with any blaze. On the River Elbe there are thirteen fire-boats, which are useful for other purposes as well. One of these boats has a capacity of about 2,243 gallons per minute, five have a capacity of 1,290 gallons, and seven have a capacity of 520 gallons per minute. The largest of the boats is used as an ice-breaker. Twelve of the fire-boats are used as ferry-boats, but respond at once to an alarm. They take on the firemen and proceed to the fire.

The German fire chiefs are very proud of their departments, but are honest enough to see merit in others and their own shortcomings. That they are willing to acknowledge the superiority of another department is shown by the fact that Chief Westphalen, of Hamburg, considers the department at Bremen the best fire department in the Fatherland.

BELFAST'S NEW WATER SUPPLY

THE greatest system of engineering work that Belfast, Ireland, has ever undertaken was inaugurated in October of this year. This was the start made in the new system of water works for the city. Belfast and vicinity use an average daily amount of water equal to thirteen million gallons, but the present works at Woodburn and Stoneyford can supply, according to the estimate, but eleven and one-half million gallons. The difference has been taken out of the storage reservoirs. In 1892 the water commissioners, after making careful examinations of the available sources of supply for an increased water yield, went to Parliament for further powers to acquire more catchment basins. The result was that the commissioners adopted the scheme of supply which had its origin in the seaward catchments of the Mourne Mountains. The distance from Belfast was considerable, but there was no area near the city that was free from the danger of pollution.

The Belfast Water Act that permitted this further increased supply was free from the usual English and Scotch schemes that give the riparian owners one-third of all the water in the regular daily flow by way of compensation. There is no compensation water to be given to the

streams and the city can take all the water that there is.

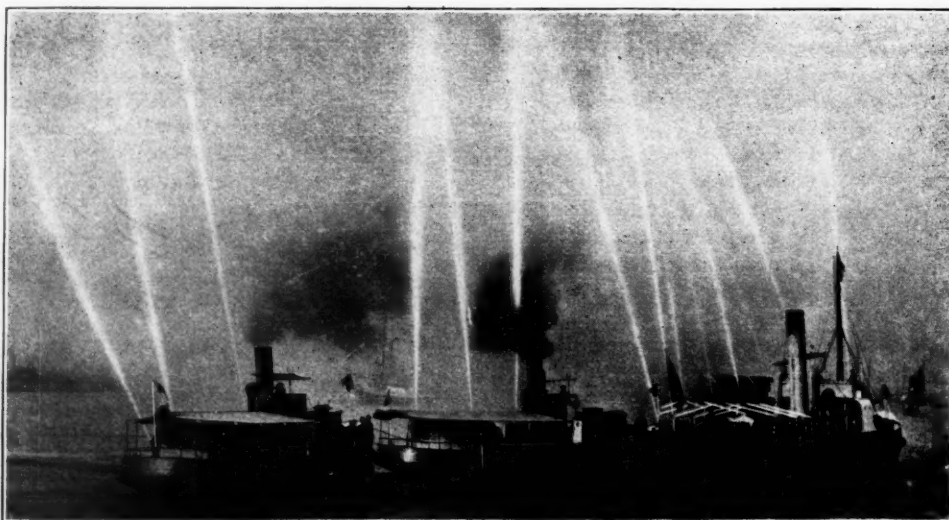
The highest elevation of this Mourne catchment area is 2,800 feet above the sea level and the average rainfall, as indicated by some of the gauges, sixty inches per year. The area of the gathering grounds is about 9,000 acres, and the average elevation 1,700 feet above the sea. Danger of pollution is absent, as there is no population and the water commissioners own all the land. After seven years' observations, it is estimated that the catchment area will, with proper storage reservoirs, yield twenty million gallons per day in average years, and there is room for further enlargement of the area. The main conduit has been made large enough to carry thirty million

gallons per day, but the metal pipes that have been laid are limited to a daily supply of ten million gallons. Other lines of pipe will be laid as the necessity demands. Two large storage reservoirs have been authorized to enable the commissioners to draw twenty million gallons from the district. The largest of these reservoirs will cover about 200 acres and will hold 2,500 million gallons of water. The embankment will be of earth and puddle construction, with a foundation trench filled with cement concrete. The embankment will be ninety-three feet in height, and, as the river that feeds it is liable to sudden floods, there will be a flood tunnel in addition to the usual waste channel.

The second reservoir is situated about one and three-quarter miles from the first and will contain about 1,250,000,000 gallons; but as the bank of this reservoir will contain very much more earth than the other, the estimated cost of this one will be proportionately more than the first.

In ordinary level ground, the cost and cover method has been followed in building the aqueduct from the reservoirs, the total length being about thirty-five miles. Tunnels have been driven through the mountains and the valleys have been crossed by dips formed of steel or cast iron pipe. The former kind of pipe has been used where the pressure is great, in some cases reaching a 400-foot head. There are seven miles of tunnel, sixteen of cut and cover and twelve of pipe. The longest tunnel is over three miles in length and is mainly through rock. In the cut and cover portion of the aqueduct the material used was mainly concrete cement, most of the stone and sand being obtained on the line of the works.

The cost of the larger reservoir with one line of conduit and a single thirty-six-inch main into the city, will amount to the sum of \$4,750,000. The second reservoir, with a further line of conduit, will bring the expenditure up to about \$6,250,000.



HAMBURG FLEET OF FIRE BOATS

THE TELESCOPIC AERIAL LADDER

Pittsburg Leads the United States in the Newest Thing in Fire Apparatus—The Adoption of a European Idea

To step out of a fifth story window on to the top of an aerial ladder is, even in the excitement of a fire, a ticklish piece of business. To descend that same ladder, swaying and giving under the weight of the fireman and the persons making the descent, is still more nerve trying to one who has not had the training of a fireman. A woman with skirts will find the descent of a ladder difficult, and especially so when she is endeavoring to get out of the reach of flame and smoke. At such a time she is not as cool as at other times. The city of Pittsburg, Pa., is now in possession of an aerial ladder that does away with all these nerve-racking ordeals, and makes descent from the window of a burning building more of a pleasure than a thing to be dreaded, even with death behind. The "Smoky City" is the only one in the country in possession of this unique piece of fire apparatus, which is a pneumatic, telescopic aerial ladder. The tests of it in the above city were highly satisfactory, and more of the same kind will no doubt be placed in service.

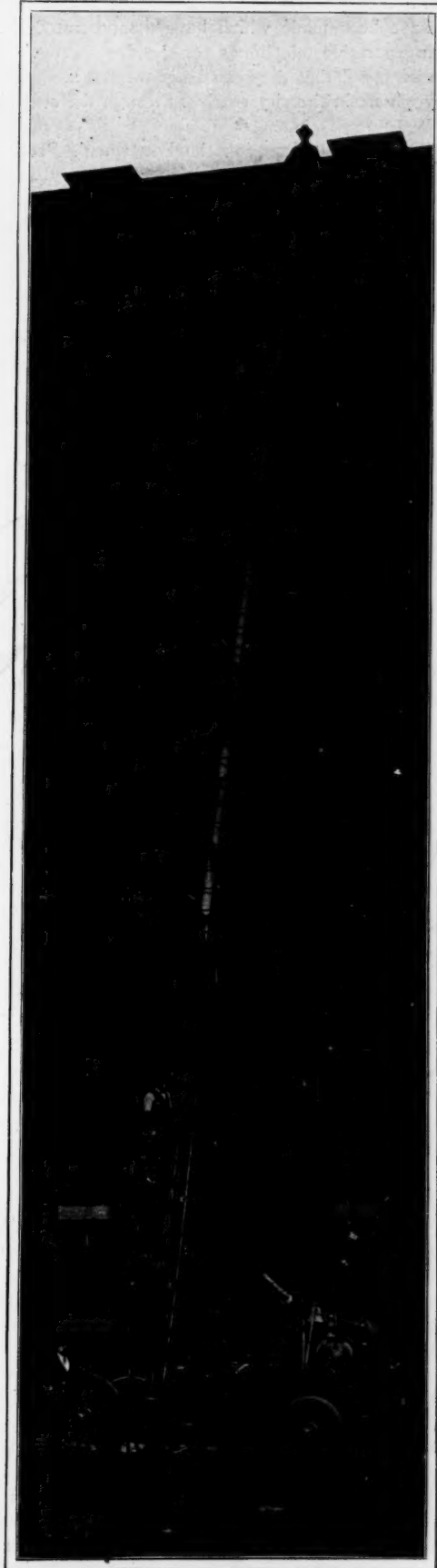
The apparatus is a combination chemical fire engine and water tower as well as aerial ladder. It is quick, simple and reliable, and is designed to carry other ladders and assorted fire apparatus such as is found on any hook and ladder truck. The new apparatus is worked by compressed air. A tank containing air under a pressure of 300 pounds to the square inch is located about the centre of the truck, and this pressure is used to lift the ladder. This ladder is unique in the fact that it is in four sections, each of which is mounted on the side of a heavy steel tube. These tubes telescope one another and fit so closely that no air is allowed to escape. A smaller tank containing air under 100 pounds pressure is placed along side and forward of the large tank, and the pressure in this is used to swing the ladder around from one side of the street to the other so that buildings on either side can be reached. To offset the possibility of tipping, the truck is made heavy, about 10,000 pounds, but, as it is mounted on rubber tires and roller bearing axles, two horses can draw it easily.

As may be seen from the illustrations, the whole tank revolves when it is desired to swing the ladder from side to side. In the long cut the smaller tank is extended at right angles to the ladder and towards the building, so that it cannot be seen.

By means of this ladder one, two or three men can be lifted quickly into the air, and each can be put at will into any story of a building within reach of the machine, but, as the illustration shows, the apparatus is strong enough to carry a dozen men. A line of hose can be carried up by the firemen on the top of the ladder, the nozzle seen just back of the driver's seat can be affixed to the top and the hose-line connected with it, making a water tower which will give the best of service. Under the seat of the driver is a large chemical tank of 100 gallons' capacity, which can be played on the fire at the moment the truck reaches it.

When it is desired to rescue a person from an upper window, the ladder is shot into the air as far as needed, the person steps out on to the top round, the tubes telescope gradually but quickly, and the person is landed safely on the ground. The rescued one does not have to climb or be carried down a swaying ladder as in the old trucks, but simply holds on to the top and the air "does the rest."

While the new Champion Pneumatic Telescope Aerial Electrically Insulated Hook and Ladder Truck at Pittsburg is the only one in the country, it has become widely known in Europe, and especially in Germany, and no first-class fire department is complete without it. Recorder J. O. Brown, of Pittsburg, saw this device at work at the Paris Exposition, and was so well pleased that he ordered the Fire Extinguisher Manufacturing Company, of Chicago, to supply one to the department of the "Smoky City." The inventor of the machine is Captain Schapler, of the Prussian army in the artillery branch. The truck has been exhibited at the Paris Exposition and at the recent Fire Exposition at Berlin, at each of which places it secured a grand prize.



THE AERIAL FIRE LADDER EXTENDED

FIRE AND POLICE ITEMS

Personalities—Fire Loss for 1901—A Reverend Fireman—Portable Fire Telephones—Bad Work of Politics—No More Easy Money—To Protect Small Towns

PORTABLE FIRE TELEPHONES.—A new system of communication with headquarters has been worked out in Toledo, O. Experiments have been made which have demonstrated the practicability of using portable telephones for the fire service. The telephones are so arranged that they can be connected at the fire alarm boxes and any 'phone in the city reached through the central.

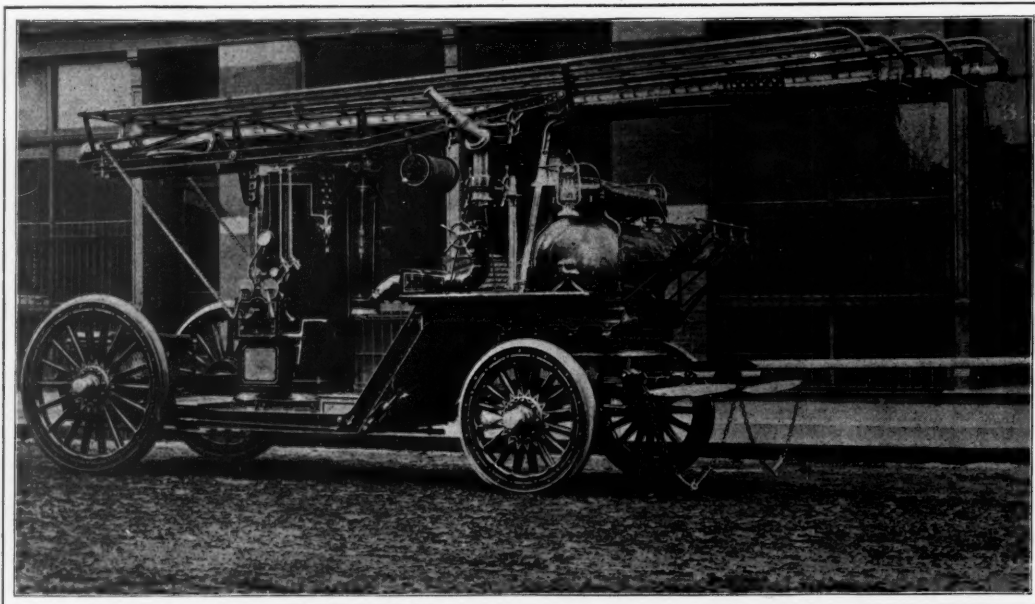
POLICE COMBINE.—Hereafter the Policemen's Protective Association of Chicago will mete out punishment in every way possible to those city officials who oppose the aims of the organization. Solemn oaths bind the members to the stern performance of this duty. Better wages for the policemen will be obtained by the organization, if possible, but the main object will be to intimidate any official who opposes it.

POLICE TO CLEAR SIDEWALKS.—The Police Commission of Trenton, N. J., has issued orders to Chief of Police Hiner to enforce the ordinance in reference to persons obstructing the sidewalks throughout the city. Henceforth all obstructions such as bicycle

plans of the Police Commissioners of Baltimore, Md., are carried out, policemen who are victims of accidents traceable to their own carelessness, or which occur while they are off duty, will not only be dropped from the salary list while incapacitated, but will be liable to trial for carelessness. The large number of cases of officers on the sick list but drawing full pay who had met with accidents determined the commissioners in this action.

FIRE DOCTOR WANTED.—Chief Allen, of Trenton's (N. J.) Fire Department, wants the commissioners to have a physician appointed to the department to render aid in case of accidents to the men at a fire. Persons that receive injuries at a fire often have to wait a long time before the arrival of a doctor. He asked that the physician of the police department be assigned also to duty for the fire department to answer all second alarms. New York City has two or three surgeons regularly attached to the fire department and other large cities in the country have similar officials.

NO MORE EASY MONEY.—Heretofore it has been the prac-



PITTSBURG'S AERIAL LADDER CLOSED

racks, boxes, barrels and advertising signs of all kinds must be kept off the sidewalks so that the full width of the latter will be available for pedestrians.

A REVEREND FIREMAN.—The Rev. James A. Fairly, pastor of St. Paul's Congregational Church in Nutley, N. J., has applied for membership in the local fire department. A large number of the fire department recently resigned and the Fire Board have had a hard time obtaining new members. Mr. Fairly said he considered it his duty to look after the material as well as the spiritual welfare of the community.

FIRE LOSS FOR 1901.—The fire loss in the United States and Canada for the past year was the largest of the last three years. In 1900 the total loss was \$163,362,250, but in 1901 the grand total was \$164,347,450. During December there were 253 fires in which the loss was over \$10,000, nineteen of which were between \$100,000 and \$200,000, and ten between \$200,000 and \$550,000. During the whole year there were 2,522 fires at which the loss was over \$10,000.

TOO MANY ABSENT ON SICK LEAVE.—If the present

tice in the city of Worcester, Mass., to give half of a fine paid by a peddler to the officer making the arrest. Several members of the force have developed such sharp eyes for violation of ordinances that their coffers have been kept full from the money from these fines. The Chief of Police received notice from the Attorney General of the State that it was illegal for an officer to receive any part of a fine imposed, so the practice must stop and the police lose their extra income.

TO RAISE STANDARD OF DISCIPLINE.—The police force of Bayonne, N. J., were given some pretty hard knocks by Mayor Seymour in his annual message to the council. He said that the standard of discipline must be raised. The members of the force do not, in many instances, show their superiors the proper respect and confusion and disorder is the result of this laxity of discipline. When complaints have been made against an officer, his friends have retaliated against his superior such as, to restrain him from the performance of his duty.

TO PROTECT SMALL TOWNS.—The Superintendent of Police of Cincinnati, O., Philip Deitsch, has called upon the chiefs of

police in the State to meet at Columbus for the purpose of adopting measures for a better unity of action in police work. The main object is to break up the gangs of safe blowers, etc., which have been operating freely in the smaller towns and cities. This organization, if it is formed, is to be a branch of the national organization to which most of the police chiefs in Ohio's large cities belong. Those that are not members of the organization have no means of making a concerted action against the criminals.

NEW POLICE RULES.—The police of West New York, N. J., will have to walk the crack if the new rules are strictly enforced. Officers will not be allowed to talk with citizens or with each other unless on police business. They are required to give particular attention to the sanitary condition of their posts and report anything detrimental to health. No member of the force shall be a delegate to or a member of any political convention and no officer shall act as a member of any board of registration or election or in any primary election. All officers will look out for boys playing "craps" and arrest the offenders. Station houses shall not be made the lounging places of any one and only members of the force, town officers and persons on business will be allowed in the houses.

DURBAN FIRE SERVICE.—It is a small but efficient fire department the report of which has come from its home at Durban, South Africa. During the year of 1900-1 Fire Master Morgan and his men answered fifty-four calls, five of which were false and only seven resulted in a loss of over \$5,000. Compared with the previous years the number of calls has increased considerably. The department is fitted with the electric fire alarm system and it worked perfectly during the year and the water pressure was good except in three instances. The department consists of eleven firemen and officers besides the master, and these are assisted by twenty-four auxiliaries. The department was increased during the year by the addition of the plant of the Natal government railway fire brigade, valued at \$14,453. A fire-boat has been ordered by the government and the fire master is anxious to have new fire stations, including a large central station, and reminded the council that the borough is growing so rapidly that increased service was necessary.

THE BAD WORK OF POLITICS.—The folly of putting off until to-morrow what should be done to-day has been emphasized in an unpleasant way to the people of Denver, Colo., in the loss of their city hall. Politics in the department did its work in running down the service and appropriations intended for its betterment have been diverted to other objects. For instance, the \$155,000 appropriated for the fire station on Capitol Hill has not yet been spent in erecting the building, and other buildings that should have been built long ago and for which money had been appropriated are still unbuilt.

The Chamber of Commerce has taken up the subject and its report shows Denver to be poorly equipped in comparison with fourteen other cities of the same approximate size. Denver has but eight steamers and three chemical engines, while Columbus, O., has fourteen of the former and seven of the latter, and St. Paul, Minn., fifteen of the former and five of the latter. Denver has four hook and ladder trucks, St. Paul eight and Columbus seven. Denver has 19,000 feet of hose, St. Paul 45,500 feet and Columbus 26,000.

TO STOP WHISTLES AS FIRE ALARMS.—The fire commissioners of San Francisco, Cal., have decided to stop the blowing of whistles as fire alarms. Chief D. T. Sullivan of the fire department suggested to the commissioners that the paid department had been long enough installed to enable several members of each company to become familiar with the telegraphic code in use in the department, and that battalion chiefs can be accompanied on their rounds by a competent operator, who will stand at the street box and receive all alarms from the central office, thus relieving the chiefs of the necessity of listening for the whistles. Heretofore the whistles were also of service in notifying the men in restaurants and barber shops, but the repair of the old gong lines will make this service no longer necessary. The great objection to whistles lies in the fact that the alarm of fire was made public and served to draw large crowds and create confusion. Chief of Police George W. Wittman, however, objects to the abolishing of the whistles on the ground that, as there are no dormitories in the police stations, there are no reserves on hand to answer alarms and the whistles notified the police on street duty of the existence and location of a fire.

METHODS OF RUSSIAN POLICE.—It is a long cry yet before there will be anything like freedom of speech and assemblage in Russia. The police are all powerful in the land and permit no meetings of private persons for any purpose. Only chartered corporations and associations can hold meetings, and no premises can be hired without first obtaining a permit from the police. All crowds, except those in places of amusement or worship are dispersed, and in St. Petersburg and some other large cities one cannot entertain a company of friends at his house without a police permit. In every case a most searching examination is made. The police have free access to all assemblages whatsoever and in theatres free seats are provided for the police officers. All clubs and associations of every kind must have a charter, which is carefully scrutinized by the authorities before being granted. Even churches must receive police sanction before the same can be founded and the meetings are subject to the same supervision as any other meeting. Schools cannot be opened without permission of the Minister of Public Instruction, and the applicant must submit a certificate of good moral character from the local police, and even then permission is often refused.

FIRE AND POLICE PERSONALS

—The Bayonne, N. J., fire department has elected Alfred Varian chief.

—Chief F. A. Leonard has been re-elected as head of the Fire Department at Taunton, Mass.

—Mr. Charles Van Fossen succeeds Mr. See as Chief of the Fire Department at Elmwood, Ind.

—Every company in the fire department has endorsed the re-election of Chief P. W. McFarland, of Ridgeway, Pa.

—The recent election in the Minneapolis, Minn., Fire Department resulted in the re-election of Chief J. R. Canterbury.

—Assistant Chief Arthur H. Tendering of Peoria, Ill., has been elected to succeed the late chief, Carl Moeller, of the Fire Department.

—At the annual election of the Reading, Pa., Volunteer Firemen, Chief George W. Miller was unanimously re-elected. Chief Miller was born in Reading in 1850, and has been a fireman for thirty-five years.

—Mr. Richard R. Laimbeer is the new deputy fire commissioner for the boroughs of Brooklyn and Queens of Greater New York.

Mr. Laimbeer is a lawyer and will preside over the trials of the firemen and also supervise all transfers.

—Mr. Edward A. Evans has been appointed to the position of Superintendent of the National Bureau of Identification with headquarters at Washington, D. C. Mr. Evans was formerly Assistant Superintendent and succeeds Mr. George Porteous, who has been removed.

—Three young men owe their lives to Chief of Police Patrick Brady of North Bergen, N. J. The men overturned their boat in the Hudson river and were half frozen when the Chief reached them from the shore in a row-boat. They promptly capsized the Chief's boat, but he is an expert swimmer and got them all to shore.

—Chief William Necker of the Fire Department of Union, N. J., has threatened to cause the arrest of any of the councilmen who pull the fire alarm boxes for any other purpose than fire. The committee of the council on fire matters had intended to test the boxes which were reported in poor condition. Captain Knight of the Police Department will assist the councilmen in their work, and will not allow any interference by Chief Necker.

A SUBSTITUTE FOR WOOD IN INTERIOR CONSTRUCTION

Floors for Municipal Buildings—Disadvantages of Wood Floors—A Comparatively New Flooring Material of Unquestionable Merit—Used by U. S. Navy and Many Public Buildings—Excellent Qualities

STRANGE as it may appear in the light of modern progress in building construction, especially as regards school houses, libraries, civic halls and other structures maintained for public use, the question of the durability and suitability of the floors employed, has received but scant attention.

On the use of board floors for municipal buildings the risk from fire is to be reckoned with. It is in the nature of an axiom that school houses, court houses, and municipal buildings generally should be of fire-proof construction throughout. To construct them otherwise invites not only property loss, but the destruction of human life as well.

Board floors then constitute a menace through fire. True, a method has been devised and is now being employed whereby wood is rendered fire-proof, but the treatment is expensive and the wood thus treated has a tendency to return to its normal condition through the evaporation of the salts employed. There is also no remedy for the warping and buckling to which wood in its natural state is subject. It is this latter feature of wood floors which leads to still another objection. The interstices between the boards of a wood floor become the receptacle of filth and germs.

THE SUBSTITUTE FOR WOOD FLOORS

But it may be asked if wood floors are to be condemned, where is the substitute to be found? Certainly not in asphalt, for asphalt, while excellent for streets and for many other purposes, it not adapted for the service needs of interior floors above the basement. Not in cement, for cement, while fire-proof, will crumble and disintegrate with time and the dust of its disintegration together with the need of constant repairs, forms no less an objection, than the cold, inert and generally displeasing surface it presents.

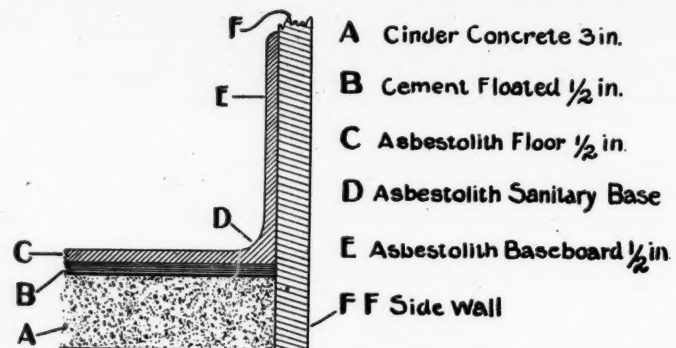
Not in tiling, for while tiling can often be used to advantage in the vestibules and corridors of municipal buildings, the coldness, inertness and noisiness of tile floors, renders it objectionable for school rooms, libraries, halls, in fact for all classes of rooms devoted to utilitarian purposes.

It might be urged that the floor, whatever its character, may be

various other causes. At best, linoleum must be frequently renewed, and however low its first cost, in the end will prove expensive.

It has long been conceded that if a suitable plastic material could be produced, a material which when laid down should harden quickly and present a continuous surface, free from unsanitary cracks and joints, a surface fire-proof, yet light and warm and cheerful, with none of the defects characteristic of cement, the floor problem as relating to public buildings, would have progressed a long way toward solution.

If, then, a floor of this material should prove to be more durable



SHOWING ASBESTOLITH BASEBOARD AND FLOOR

than tiling, and throughout its life should be free from cracking and disintegrate with attendant dust, if it should prove as flexible and elastic as wood yet far more noiseless, should be susceptible of being readily cleaned and yet never become slippery, as is the case with tiling and mosaic, and if, moreover, the first cost of such a floor should not be prohibitive, then it must be admitted, the problem of floors for municipal buildings, will have been solved. It may be added, the problem has already been solved. The material which marks this great advance in floor construction is called Asbestolith.

THE SUBSTITUTE DISCOVERED

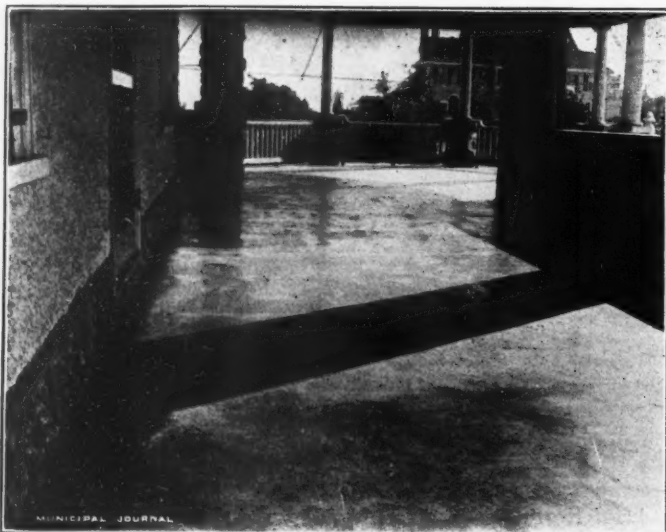
Originally the invention of a German chemist, the formula for Asbestolith was purchased in America and improvements in the original formula were instituted from time to time, as occasion seemed to warrant. After three years of successful use in buildings of every description, after being adopted by the United States Navy upon several of its swift cruisers, Asbestolith, its formulæ, patents, factory and good will, has been taken over by a strong company prepared to place it in the commanding position its merit deserves.

In practice, the Asbestolith material is shipped in the form of a dry powder to the point where used, there to be mixed with a liquid especially prepared at the company's works.

The plastic material resultant is then laid upon the surface to be covered, much after the manner of ordinary cement. Any competent cement worker or plasterer can do the work.

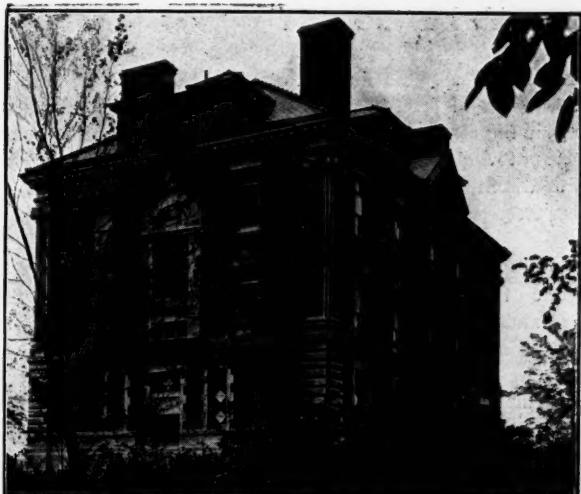
After the material has hardened, a process which requires but from twelve to twenty-four hours in moderately dry weather, the floor is then ready for use.

If properly laid, the surface thus presented is smooth, fine grained and continuous and will outwear any known form of floor. Asbestolith when thoroughly dry weighs in the ratio of but three to seven of cement and contains sufficient asbestos fibre to afford a perfect grip to tacks or screws. A remarkable quality of the finished product lies in its perfect freedom from chipping, cracking and disintegration while, on the other hand, its elasticity renders it peculiarly adapted to the floors of elevators, of cars and of ships. Further, the coloring matter is thoroughly incorporated throughout the body of the material and consequently it holds color well. Again the material successfully withstands both acids and alkalis, a feature of importance to the battery rooms now so common to municipal buildings.



PORCH OF COUNTRY RESIDENCE OF LATE WM. A. COPP, GREENWICH, CONN., LAID WITH ASBESTOLITH

provided with a suitable covering, such for instance as linoleum, and thus the defects of the floor proper be largely neutralized. But linoleum is highly inflammable and is, moreover, readily destructible in other ways. The moving of heavy furniture across it may utterly ruin it, or it may be destroyed through the blistering of the material due to carelessness in scrubbing, by the heat of steam pipes, or from



STILLMAN INFIRMARY, CAMBRIDGE, WHERE ASBESTOLITH IS USED FOR FLOORING

Another feature to which Asbestolith readily adapts itself is the so-called sanitary base, a gradual curve from floor to base-board, eliminating the cove angle with its unsanitary trap for filth.

This combination of floor, with sanitary base, is the style adopted by the new Stillman Infirmary at Harvard College, the most complete building of its kind in the country and in which several thousand feet of asbestolith flooring together with sanitary base has been employed.

No oil is used in the manufacture or composition of Asbestolith, yet oil may, when desired, be used as a dressing for asbestolith surfaces with excellent effect. As previously stated, asbestolith floors never, under any circumstances, become slippery.

SOME OF ITS GOOD QUALITIES

Possibly, the most remarkable quality of asbestolith is to be found in its resistance to heat. To its qualities as a non-conductor of heat is due its warmth in winter and its comparative coolness in the heat of summer. It is, moreover, an excellent non-conductor of

electricity. It is almost noiseless. Above all, it is absolutely fire-proof. The material is perfectly neutral, that is, neither expands nor shrinks in setting, hence repairs when necessary may be effected both economically and efficiently.

Asbestolith adheres perfectly to almost any sort of base. As a covering for board floors, it has no equal and it may be applied with equal facility, and with fire-proof effect, to baseboards, wainscoting and trim.

Where fire-proof construction is essential, the better plan is to prepare a base of cinder concrete floated with at least a half-inch of cement in order to yield a level surface. Upon this, asbestolith is then laid down to the depth of a half-inch and properly finished. It may also be used to cover asphalt floors as was done in the case of the operating room of the Hahnemann Hospital, in New York City.

In the United States Navy, the asbestolith floors thus far employed, have been laid down directly upon steel plates and with excellent results.

The expansion and contraction of the steel frame work of modern buildings is peculiarly trying to the floors of such structures, and terrazzo, granite or even mosaic floors soon develop cracks which radiate outward from the metal supports and for which there seems to be no remedy.

It is here that the flexibility of asbestolith surfaces comes into play, permitting them to adjust themselves to inequalities due to unequal expansion of the metal framework, and at the same time to escape fracture.

The material lends itself readily to designs in color and is susceptible of a high polish upon surfaces not subject to abrasion.

The element of cost as regards any building material of peculiar merit for municipal structures is scarcely to be considered, and this is practically true as regards a material of such unusual character as to place it in a class by itself; yet it may be stated, that the cost of asbestolith is much lower than tiling and but little higher than the best quality of linoleum.

The future of this material for municipal building construction seems assured. Asbestolith forms an ideal floor for school houses, for libraries, and for halls and court-rooms, and seems to solve the problem of an interior lining for vaults in which books of record are preserved.

THE BARDWELL VOTOMETER USED IN NEW YORK ELECTION

IN view of the current discussion concerning voting machines, it seems pertinent to point out that the success attending their use has been an unusually impressive one. The demands made upon a voting machine are very extraordinary. It is probably within bounds to say that so high a standard of performance is not required of any other piece of mechanism. In most instances, circumstances require it to be placed in the hands of election officers not qualified, as a rule by any special mechanical training, and who, in many cases, see the machine for the first time only when they get to the polls on the morning of election. The operation of the machine throughout the day is absolutely under their management and control. During the elections, so far held with machines, they have been used by people of the varying grades of intelligence, who likewise have never seen it before. Under these conditions, being both controlled and used entirely by unskilled manipulators, it is required to produce an absolutely infallible result.

That the Bardwell Votometer met all requirements, in this city, where it was recently used in a special election, the following letter, from James J. Bell, chairman election board of inspectors, of the Second election district of New York, bears evidence:

"Unsolicited and unasked for, I wish to tender you my heartiest congratulations on the working of your 'admirable machine' and I can truthfully say improvement seems impossible. In the words of Mr. Asa B. Gardiner, after voting, 'I take off my hat to that machine.' I firmly believe that it is without a peer in its line. Its work is so correct, so efficient, so reliable and yet so simple that its adoption by this State will be only a matter of a very short time.

It is positively needed. Its principal feature seems to be the rapidity in which votes are cast, and the instantaneous canvass of the election, *excluding* the possibility of a defective ballot." The letter was addressed to the Bardwell Votometer Co., of New York.

The function the machine is designed to perform, that of registering and counting votes, is one of the most important which any piece of mechanism has to do, and yet a voting machine must do these things with absolute accuracy, and under conditions which the makers of any other device would not submit to and could not if they would. Take, for instance, a cash register; in the first place this is only handled by persons of some proven intelligence, and they are instructed with great care before the machine is intrusted to them. Moreover, they become familiar with it, using it many times during each day. Whereas, in the case of the voting machine, a voter uses it for a moment or two not more than once a year. It would be useless to try to persuade the maker of an engine, pump or any other well known mechanical device, to allow it to be operated or managed by a person not specially qualified and instructed in its use. To guarantee its successful working under such circumstances would be impossible. Failure would be certain. On the other hand, voting machines have repeatedly met each and all of these conditions successfully, and it therefore seems but fair to say, that a machine which can produce the results shown again and again by voting machines, has demonstrated a degree of reliability and mechanical positiveness within itself, and unaided by skilful handling against which no fair or reasonable argument can be made and which is certain to aid in bringing about its universal adoption.

MANHATTAN RAILWAY ELECTRICAL EQUIPMENT

THE importance to New York of electric traction on the elevated railway can scarcely be estimated. The change will increase the efficiency and reliability of the service, and secure greater economy of operation; and, from the public point of view, it will also eliminate many objectionable features of the old "L" service. This railway presents the most important achievement of electricity in the transportation field.

The scope of the work and what it means to the people of New York, as well as to the railway interests, may be judged from the fact that the Manhattan system is the most important "L" railway of the world. The electric system is designed to supplant 310 steam locomotives used for hauling 1,200 cars, and carrying approximately 200,000,000 passengers in the course of a year. The largest trunk line of the country whose official report is available shows less than 40,000,000 hauled in twelve months. Of course the latter are largely "long-hauls," but the aggregate mileage of the Manhattan is considerably in excess of that of the trunk line mentioned.

The substitution of electricity for steam will enable the management to operate six car trains at a higher rate of speed than would be possible with the heaviest steam locomotives available for five-car trains on elevated structures; moreover, maximum speed can be attained quicker and much more effective control can be secured. It will also eliminate smoke, steam, cinders and the noise in operation that cannot be overcome as long as steam locomotives are used. Another advantage that will be enjoyed by the management and patrons alike is the electric lighting of the trains, stations and platforms, yards, offices and shops, and the heating of the cars and the operating of the shops by electricity.

Current for the operation of the new plant under this plan is generated at a central electrical supply station, located as near the center of the system of distribution as is possible, and from this point it is transmitted through sub-stations to the car lines at several points. This system included thirty-seven miles of road, on much of which express as well as local service is given. A revised schedule prepared for electric service provided for more trains and a greater number of cars as well as faster trains than would be possible with steam locomotives.

These improvements in the service could only be accomplished through the marked advancement that has been made in the building of large generating units, and the development of the distribution ap-

paratus adopted for this installation. This most important feature of the work, and all the problems involved in the designing and building of the electrical machines were entrusted for solution to the engineers of the Westinghouse Company. This company has designed and built for the Manhattan road the most comprehensive and complete electrical power generating and distributing apparatus in the world.

Everything about the power house impresses the visitor with the magnitude of the undertaking. It is 204 feet wide, 531 feet deep on one side and 536 feet on the other. The structure itself is an imposing building, evolved from Roman arched construction with classic details. The walls are of granite, brown brick and red tile, with buff chimneys and copper faced monitors.

Interest naturally centres in the electrical apparatus at the power house, the big Westinghouse generators at once commanding universal attention. Each is rated at a normal capacity of 5,000 kilowatts, or 6,700 horse-power, but is capable of delivering during the hours of maximum traffic 7,500 kilowatts or 10,000 electrical horse-power. They are forty-two feet high, each weighing approximately 900,000 pounds, and the diameter of the revolving field, which weighs 370,000 pounds, is thirty-feet. They are driven by 8,000 horse-power Allis-Corliss engines of special design.

The generators, as already mentioned, are the largest electric machines ever constructed.

In the auxiliary equipment of the power house 250 kilowatt multipolar generators of the Westinghouse type are employed as exciters. The potential of the exciting current is 250 volts.

There are also included in this equipment three 800 kilowatt rotary converters, for changing the current for use about the plant. This equipment is entirely independent of the sub-station apparatus. Nine 300 kilowatt transformers and twenty-four of seventy-five kilowatt capacity are employed for various auxiliary purposes about the system.

The judgment of the Manhattan Company in adopting this system has received the most flattering commendation at the hands of the Rapid Transit Subway Construction Company of New York, which has ordered for the equipment of the subway system the same type and size machines as those used in the Manhattan power house and sub-stations. The Westinghouse Company naturally feels elated over this substantial endorsement of its work.

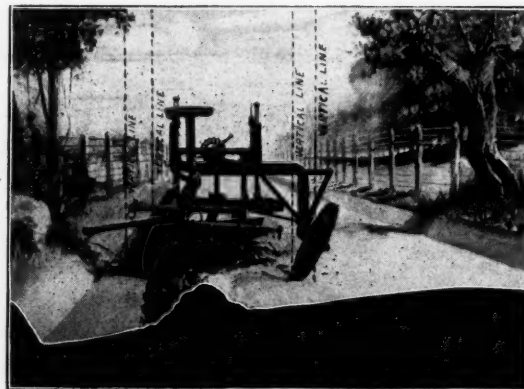
THE LITTLE GIANT ROAD MACHINE

THE enthusiasm for good streets and improved highways is sweeping like a tidal wave over the entire country. During the last twelve months more than a score of state good roads associations, and several scores of county and town associations, have been organized and have entered upon an aggressive career in the betterment of public highways in their several localities.

The keenest interest is manifested on every hand to learn about the latest and best road making machinery. Our readers, therefore, will be much interested in the "Little Giant" road machine, which is constructed by the Indianapolis Bridge & Iron Works, of Indianapolis, Ind. As small steel bridges and culverts are essential to the betterment of public roads, it will be interesting to know that this same company also manufactures bridges and culverts of the most approved type. The above illustration gives a fair idea of what the machine looks like when at work, but it fails to tell all the good points about it. It is impossible in a short article to enumerate the many good points of the machine, but all these are clearly set forth in a forty page well illustrated catalogue issued by the company, which can be had upon request. The "Little Giant" has been used with great success in the construction of roads North, South, East and West. The machine is guaranteed to do first class work and the price is consistent with that quality of goods. The motto of the concern is, "Not how many, but how good machines we can construct." All the Company asks is that you give them an opportunity to ship a machine and operate it on your roads, and if, after a thorough test has been made, you think it does your work success-

fully, it will then be pleased to take your order for a machine.

If there is one thing above another which requires the constant and earnest attention of city officials it is the betterment of not only the streets of the city but of all roads leading thereto. The people,

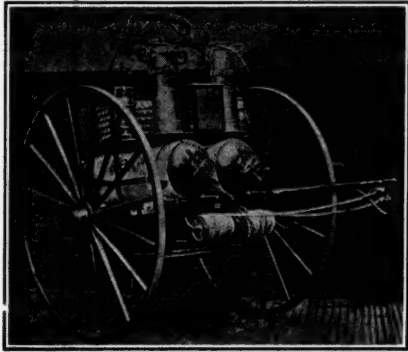


FRONT VIEW OF THE "LITTLE GIANT"

as a rule, demand good streets, but they are not so insistent in asking for better highways in the suburbs and for the improvement of the main roads, therefore the city official must co-operate with the county official to this end, and so promote the general welfare of the community.

THE REX FIRE EXTINGUISHER

THERE is no more effective agency employed at the present time in the extinguishment of fires than chemicals. The apparatus invented by American genius for applying this enemy of fire is satisfactory in every respect because it is adapted for use in the household, the factory, the public building and the fire department. It is so simple that a little child can use it, and yet so effective that it is considered one of the most useful pieces of apparatus in American fire departments. As a matter of fact, an average of 50 per cent. of the fires in this country are put out by means of chemical apparatus.



THE "REX" HAND ENGINE

The United States Government has thoroughly investigated this question and, as a result, placed an order some months ago with the Rex Fire Extinguisher Company, of New York, for a large number of its well known and effective chemical fire engines, and several hundreds of its hand fire extinguishers, for use in the seven branches of the National Home for Disabled Volunteer Soldiers situated in different parts of the United States from Maine to California. Mr. J. M. Bermingham, general treasurer of the National Home, recently addressed a letter to the Rex Fire Extinguisher Company in which he said: "I am directed by the President of the Board of Managers, National Home for Disabled Volunteer Soldiers, to inform you that a contract for the delivery of engines and extinguishers to the various soldiers' homes mentioned herewith, in accordance with your proposal of May 20th, 1901, has been awarded to you."

The engines and extinguishers were delivered some time ago as follows:

	Engines.	Extinguishers.
Central Branch, near Dayton, O.....	3	50
Northwestern Branch, near Milwaukee, Wis.....	2	
Eastern Branch, Togus, Me.....	2	50
Southern Branch, near Hampton, Va.....	2	125
Western Branch, near Leavenworth, Kan.....	2	100
Pacific Branch, near Santa Monica, Cal.....	2	75
Marion Branch, near Marion, Ind.....	2	100
Danville Branch, near Danville, Ill.....	2	75
Total	17	575

A representative of the MUNICIPAL JOURNAL AND ENGINEER recently visited the salesrooms of the Rex Fire Extinguisher Company and learned from the representative that he had just returned from an extended trip of a month's duration making a personal delivery of the engines, and giving tests of the same at all the homes, and his graphic description of his experience among the old soldiers, many of whom were "Fire Laddies" before they donned the "Army Blue," would bear repeating if space permitted.

All were pleased with the effectiveness and simplicity of the "Rex" engines and extinguishers, and wished to have a hand in caring for and working the same.

The success of the Rex Fire Extinguisher Company with its engines and extinguishers is another example of the push and enterprise of our American manufacturers, for the "Rex" engines and hand extinguishers are well known, and are doing good service not only in the United States, but in all the countries of Europe, India, China, Australia, South Africa and tropical countries of this Conti-

ment. The United States Government uses them in its Navy Yards, custom houses and public buildings, fifty cases of them having been shipped to the Naval Station at the Island of Guam. Thousands are in use in the hospitals of New York State, it having been adopted by the New York State Board of Lunacy as the official extinguisher.

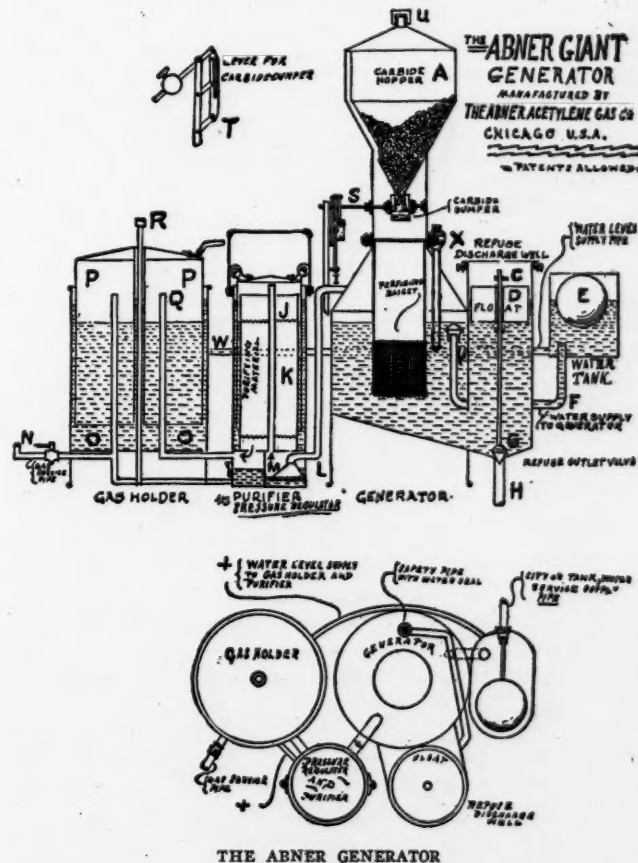
Mr. James Wheaton Clarke, the president of the Rex Fire Extinguisher Company, has demonstrated that the public will buy, and want a reliable extinguisher, and the thousands sold by the "Rex" Company prove the truthfulness of this statement.

A MODERN ACETYLENE GAS PLANT

THERE are many systems for lighting cities, towns and villages, but none which are better adapted to the need—particularly in residential streets—than acetylene gas. It is economical, safe, brilliant and efficient. It will not cause a fire. According to the statistician of the New York Journal of Commerce, last year there was a loss by fire caused by electric wires amounting to over \$23,000,000. Although there were over 20,000 acetylene gas machines of nearly one hundred different makes in use, not a fire amounting to one thousand dollars was reported as caused by the use of acetylene gas.

The well known system placed on the market by the Abner Acetylene Gas Co., of 32 La Salle street, Chicago, is now used in many towns and villages for street lighting. Prices and estimates will be submitted upon application. The company has recently installed lights in numerous towns and cities as well as institutions.

The accompanying illustration, with explanations, shows how simple the Abner Giant Generator is in its construction: (A) Carbide hopper, (B) Generator, (C) Discharge well, (D) Float, (E) Water supply tank, (F) Supply pipe to generator, (G) Discharge valve, (H) Discharge pipe, (L) Gas pipe to purifier, (J) Purifier,



THE ABNER GENERATOR

(K) Purifying material, (L) Pipe to scrubber, (M) Water seals and scrub chamber, (N) Service pipe, (O) Gas holder, (P) Gas bell, (Q) Gas from scrubber, (R) Guide for gas bell, (S) Carbide dumper, (T) Chains and pulleys or dumping device, (U) Seal for carbide, (V) Water supply to generator, (W) Pipe maintaining water level, (X) Blow off pipe.

TEST OF ELEVATOR AIR CUSHION

It is only when a serious accident happens to elevators that persons stop to consider the dangers attending the constant use of these cars. When a cable breaks with the car at the tenth story and the passengers are dashed to the bottom of the shaft and to almost certain death, people demand that something be done to make elevators safe. A test of the Ellithorpe Air Cushion made in one of New York's "skyscrapers" recently, proved that this appliance will absolutely prevent any serious results happening, should an elevator fall from the top of the highest building in the world. At the test mentioned, an elevator weighing over two tons was suspended from the top of the shaft at the twelfth floor. At a given signal the cable was cut and the car shot downward at a terrific rate. The bottom of the shaft had been fitted with the Ellithorpe Air Cushion, which brought the car to rest so gently that eggs and incandescent lamp bulbs previously placed on the floor of the car sustained no damage. Many persons have made the same trip, with no discomfort, both at the time of accidents and during tests. There is no possibility of the air cushion getting out of order as it is the simplest thing in the world. The bottom of the shaft is closed up one-sixth of its length by strong steel walls. In the side of one of them there is a peculiarly shaped opening. This opening, together with a simple valve at the base, allows the air to pass out gradually when the car falls. The air cushion formed by the rushing car gradually checks its momentum and, as the air passes out of the valves, the car settles to the bottom of the shaft.

NOTES ABOUT THE TRADE

—We are sorry to learn of the death of T. E. Wood, the eastern representative of G. M. Gest, general contractor. He is succeeded by Mr. F. C. Mott, formerly associated with the New York Edison Company. Mr. Mott is well and favorably known in his chosen profession.

—We are in receipt of a hundred-page catalogue, tastefully gotten up and bound in cloth, containing valuable information relative to brick machinery as manufactured by the Henry Martin Brick Machine Manufacturing Company, of Lancaster, Pa. Those who are interested can receive a copy by addressing the above firm.

—The Seagrave Company, of Columbus, O., recently delivered a combination engine and hose wagon to the city of Nobles, Ind., and two of the same kind of machines to the city of Elgin, Ill. These wagons are up-to-date in every respect and are valuable additions to the equipment and the fire service of these cities. The Seagrave Company understands how to turn out good work and generally gets second orders.

—Frederick P. Smith, C. E., General Manager of the Municipal Engineering Company, 1123 Broadway, New York, has returned from Havana, Cuba, where he installed thirty-two camp crematory plants under his patent, in open competition. The Municipal Engineering Company, of which he is general manager, was incorporated for the scientific disposal of sewage and garbage by the Frederick P. Smith system. The officers of the incorporation are as follows: Colonel Willard Young, president; Major George B. Burbank, director, and Frederick P. Smith, general manager.

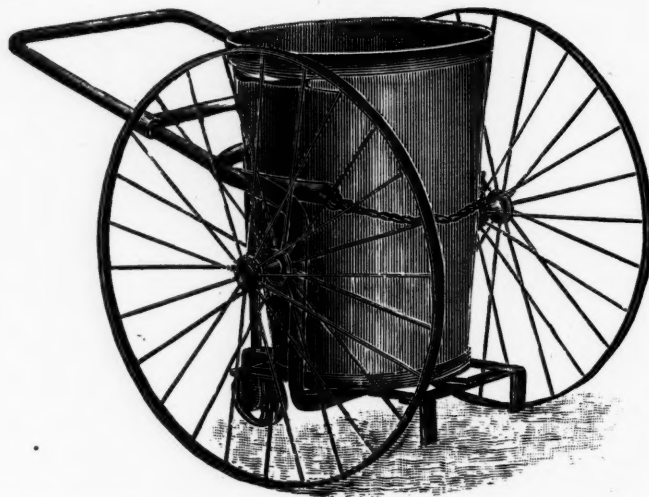
—Attractive calendars have been received by the MUNICIPAL JOURNAL AND ENGINEER, this year, from the Trinidad Asphalt Manufacturing Company, of St. Louis (not in the asphalt trust), with offices at 32 Broadway, New York; The Dickerson Paving and Construction Company, general contractors, Chester, Pa.; The Warren Brothers Company, of Boston, manufacturers of bituminous macadam waterproof pavement; Iroquois Iron Works, Buffalo, N. Y.; Pittsburgh Meter Company, East Pittsburg, Pa., and John W. Rapp, patentee and manufacturer of Rapp's Complete System for Fire-Proof Construction.

—"Modern Wood Pavements" is the title of a little booklet dealing with this subject written by Frederic A. Kummer, C. E., Jr. Mem. Am. Soc. C. E. It includes a paper upon "Recent Experiences With Wood Pavements in the City of Boston," by Mr. B. T. Wheeler, the former Superintendent of Streets. The booklet is well illustrated with views showing where the pavement has been laid—in Boston, Baltimore, Springfield, Mass., New Rochelle, N. Y.—and contains

a lot of useful information upon this subject. Foreign experiences are also given. A copy of the booklet may be had for the asking. Address the United States Wood Preserving Company, 29 Broadway, New York.

AN IMPLEMENT FOR CLEANING STREETS

STREET cleaning is a modern necessity. The authorities of American cities have come to realize the significance of the old saying that, "Cleanliness is next to Godliness." For this reason millions of dollars are expended annually in American cities in cleaning their streets. The accompanying illustration shows a can carrier for street cleaning purposes that is used not only in the various departments of Greater New York, but by many cities and towns throughout the country.



Superintendent of Streets Wilhelm, of Cleveland, Commissioner Lee, of New York, and numerous other street cleaning officials in letters to the manufacturers of this device, speak in the highest praise of its merits.

An important feature in its construction is the steel wheel. This will neither wear nor wobble. The frame is constructed entirely of steel and wrought iron. The can is made in the most substantial manner with an angle iron band that protects it and prevents bulging or collapsing. It is manufactured by Mr. Charles C. Hvass, 509 East Eighteenth street, New York City.

MERITS OF ROCK ASPHALT

A WELL known authority on asphalt recently wrote the MUNICIPAL JOURNAL AND ENGINEER his opinion about the relative merits of rock asphalt and Trinidad Lake asphalt. He dwelt more upon the excellent qualities of rock asphalt rather than what is commonly known as Trinidad or Pitch Lake asphalt. In part he said: "Rock asphalt has been mixed by Nature nearer to perfection than man can mix it, and it contains absolutely pure asphalt, not from 15 to 20 per cent. of vegetable matter, as Trinidad does. I have seen pictures of Trinidad asphalt lake, showing trees and weeds growing up through the asphalt. This shows, beyond the shadow of a doubt, it contains vegetable matter to a large per cent. Rock asphalt is considered the finest material in the world, and the pavements with which it is constructed speak for themselves, as prominent business men in cities where it has been laid, testify. Kentucky rock asphalt will not soften in summer, thereby enabling heavier loads to be hauled over pavements made with it. Such pavements will not roll under the hottest sun. It requires no binder, but is laid right on top of a six-inch concrete foundation and hardens with age, until it is harder than steel and as smooth as glass.

The Green River Asphalt Company, of St. Louis, Mo., is one of the successful companies using rock asphalt in the construction of street pavements. It has a paid up capital of \$100,000 and uses Kentucky rock asphalt, making street paving a specialty. This company owns and operates the Cherry mines in Warren County, Kentucky. The material is sold to local contractors in cities. Information will be gladly given upon application.

CURRENT LITERATURE ON MUNICIPAL TOPICS

Reviews of Some Important Books—What the Magazines and Reviews Have to Say About Civic Affairs—
Municipal Reports Received

PERIODICALS

In the *Annals of the American Academy of Political and Social Science*, Martin A. Knapp, in an article of some 3,500 words, outlines some of the arguments for and against *Government Ownership of Railroads*. It is the opinion of citizens and backed by judicial utterance that railroads are public highways, and it is a question of expediency whether or not the public should own them. The political objection is the first to occur. This is that the ownership is contrary to the traditional policy of the country, and that the expense would be too great to acquire them all at once. As regards the doctrine of *laissez faire*, it may be said that "capital always takes advantage of competition, and nowhere is that advantage greater than in the use of railway facilities. Almost any price may profitably be paid to secure immunity from practices that now prevail. Government ownership would undoubtedly remove these discriminations." "It would be a question of only a little time when all secret and preferential rates would disappear. . . . This would be an immense gain and therein lies, perhaps, the most persuasive argument in favor of public ownership." Public ownership would mean higher wages and shorter hours of service, but also an increased number of servants. Philadelphia, Pa., January, 1902. Price per year, \$6; per copy, \$1. Issued bi-monthly.

THE *Proceedings* of the American Society of Civil Engineers for December has, among other articles, the discussions on the *Effect of Curvature Upon the Flow of Water in Pipes*, on *Current Meter and Weir Discharge Comparisons*, and on the *Solution of Some Hydraulic Problems*, the papers on which were presented in previous issues. The discussions are as interesting and detailed as the papers themselves. New York, N. Y., 1901.

EDMOND KELLY writes for the *International Monthly* an article of about 5,000 words, on *Things Municipal*, which deals with municipal problems having especial reference to New York City. He lays to overcrowding nearly all problems peculiar to municipal politics, and the disposal of waste is one of the problems requiring especial skill. Inadequate municipal engineering, inadequate municipal politics are to be found everywhere, and we are still entertaining false notions regarding government. The article calls particular attention to these branches of government in which there is no element of coercion such as the post-office. The author states that the economic doctrine of *laissez faire* is doomed as a false theory, but the public are not yet aware of its errors sufficiently to consider the seemingly erratic plan as the distribution of the necessities of life by the State. He calls attention to the fact that the "majority" of citizens are not the educated, but those that vote regularly for Tammany Hall and other machines, and this majority has little interest in the regular tax rate or clean streets and pure water. The real things of value to them are those that Tammany furnishes. There are benefits such as three-cent fares, fifty-cent gas, etc., which this majority would understand and vote for. While the public do not want the municipal distribution of coal, ice, etc., "the public mind is not altogether unprepared for the municipal ownership of gas and tramways." The author then takes up the evolution of municipal government in England and France, and compares conditions there with things in cities in the United States. He calls for the hearty interest of all citizens in the workings of the city government. "Municipal government is a gigantic business, requiring as close attention on the part of those for whose benefit it exists as that of the private banker or the manufacturer or the merchant; and it is because the average citizen has not a sufficient stake in the government to make it of as much importance to him to attend to the government affairs as to his own business, that his private business is attended to, while public business is left in the hands of Tammany Hall." Burlington, Vt., January, 1902. Price \$4 a year, 35 cents a copy.

In *Civic Government in the Cycle City*, H. Wilkins tells the story of the city of Coventry, England. He tells the history of the corporation and how the problem of the slums was treated. *The Municipal Journal*, December 27, 1901. Under the caption *Municipal Light for Maidstone* is told the history and description of the new electrical station in that English city. *The Municipal Journal*, issue of January 3, 1902. London, Eng. Price, per copy, 1d.

While in the United States the democratic system of government has proved itself successful in national action, in the municipalities there is much room for improvement. In *Responsibility in Municipal Government*, an article of some 2,500 words in *The Arena* for January, T. St. Pierre discusses the remedy for the present conditions, and attempts to show wherein lies the solution of the problem of devising a free system of government for large cities. He says, "The first condition of municipal reform, then, is to give the people of the cities complete autonomy—the absolute and exclusive right to act as they please in all things municipal." The state has no more right to interfere in a town than has the Congress to infringe on the rights of the states. Such meddling tends to degrade the cities and their institutions, and the voters should be given such a form of government that they will be able to trace most easily the responsibility for all deeds of administration. Reformers have feared that concentrating control of affairs would make a mayor too powerful, and so they have resorted to compromises, but despite the general opinion as to the corruptness of common councils, "the salvation of municipal institutions lies in the restoration of the city parliaments to the position that properly belongs to the legislative branch—the first." Because of the large amount of administrative work required of legislatures, many good men will not serve. "The proper remedy for this condition of affairs is in the appointment of executive agents." A cabinet after the British model should be adopted, in which the commissioners work together, and this would have all the advantages of the concentration of authority in the hands of the mayor without the danger. With this system three objects are realized: unity of responsibility, immediate punishment for abuse of power, and immediate reward for good service. New York, N. Y. Price \$2.50 a year; 25 cents a copy.

THE *Iowa Engineer* for December, 1901, has an article of over 5,000 words on the results of experiments made on the *Sewage and Sewage Disposal of Iowa*, by A. Marston and Elmina Wilson. Analytical tables of sewage and the gauging of its flow are abundant. Ames, Ia. Price per year, \$1; 30 cents a copy. Issued quarterly.

THE January *Review of Reviews* contains two articles on the good roads movement. The first is by Hon. Martin Dodge on *How the State Can Help*. He points out the need of better roads and shows how the cost of transportation is reduced in proportion as the highways become more passable. He says that prisoners should contribute to the common good by being made to work on the roads. But every great system of highways needs the encouragement of the general government. At present all the United States government has done is to disseminate literature and give the services of advisory engineers and road experts to places asking the same. The work of the good roads trains is also outlined. The second article is a short but practical one, the use of *Burnt Clay for Roads in the West*, by Charles Rollin Keyes. He tells how the roads made of gumbo, the stickiest of clays in wet weather, can be made hard and firm at all times by simply burning this same clay and replacing it on the road. "With no more expenditure of money and effort than is now put on the country roads, ballasting with burnt clay would produce in a dozen years a system of highways equal to any of those for which France has so long been famous." New York, N. Y. Price per year, \$2.50; per month, 25 cents.

THE issue of *Municipal Affairs* for September, 1901, just come

to hand, is full of valuable articles of interest to all citizens. John De Witt Warner writes on *Municipal Betterment in the New York City Election. A Constructive Policy*, by John Martin, tells what the Low administration in New York should do. Bird S. Coler writes in *Amend the Debt Limit* on the limitation of the debt limit for New York. William S. Crandall, in *A Model City*, gives a suggestion for the Louisiana Purchase Exposition in 1903. Under the general caption of Decoration of Cities are articles by F. W. Kelsey on *Parks and Tree Planting*; *Plant Decoration*, by Katherine C. Budd; *Municipal Sculpture*, by C. A. Lopez; *Decoration of Public Buildings*, by C. M. Shean; *Beautifying Columbus Circle, New York*, by A. P. Doyle; *Street Signs and Fixtures*, by Nelson S. Spencer; *Advertising and Art*, by Milo Roy Maltbie. New York, N. Y. Price \$2 per year; 50 cents a copy.

The Century for February contains two very interesting articles relative to the improvement of the city of Washington, D. C. Daniel H. Burnham, of the Commission for the Improvement of Washington, contributes a short article on the *White City and Capital City* in which he shows how the World's Fair at Chicago proved to the American people that, while their money had been spent in artistic ways, "their vital discovery was the fact that they had built great public works in piecemeal, unrelated, and without the unity of a comprehensive general plan." "It would seem, therefore, that the World's Fair was first of all a result of dumb desire already strong in American hearts, and, second, that it became not only the embodiment of what people vaguely felt, but that it also taught that public money put into public buildings and grounds is used rightly, and so economically, only when every part of the system of public works is related to every other part, and each and all parts are constructed after a general plan." Charles Moore, Clerk of the Senate Committee on the District of Columbia, presents his first paper on *The Improvement of Washington City*. This set of papers will tell the whole story of the proposed improvements in the Capital City. He reviews briefly the way in which the French engineer, L'Enfant, worked out the grand scheme for the laying out of the city in conjunction with Washington and Jefferson. The third plan drawn by L'Enfant was accepted. "In this accepted plan undoubtedly Washington and Jefferson each had some part." "In a word, he (L'Enfant) planned the Capital City as a work of art, in which each feature should have distinct relation to every other feature; and thus he gave to the scheme that feeling of unity which to-day excites the interest and admiration of the visitor in Paris." L'Enfant conceived an exaggerated idea of his own importance, was dismissed, and so his plan has never been carried out. The Shepard régime did much to place Washington in as good a condition as it is in to-day. A Senate committee was appointed in March, 1901, to develop the park systems of the District, and, if the money is voted by Congress, their plans will make of Washington one of the most beautiful cities in the world. The general plans of the Commission in charge of the work are given in this and articles to follow. New York, N. Y. Price per year, \$4; per copy, 35 cents.

BOOKS

The Improvement of Towns and Cities. By Charles Mulford Robinson. One Vol. Price \$1.25. G. P. Putnam's Sons, New York and London.

The author of this volume is a member of many societies for the improvement of municipal conditions and speaks *ex cathedra*. Among the subjects which he discusses are sites, street plans, bridge construction, street paving, cleaning and lighting; the disposal of necessary nuisances, such as wires, smoke and the noises of street traffic; the regulation of advertising, the beautifying of utilities, the growth of trees and possibilities of public gardens. All these topics are suggestive to any one acquainted with municipal affairs, and Mr. Robinson's ideas are good. Public parks and museums of art come in for their share of comment.

THE retirement of Mr. Richard Croker from the position of chairman of the Finance Committee in Tammany Hall has caused much speculation as to the meaning of this move of the "Boss." Mr. Croker is not a man who would let a defeat such as was ad-

ministered to him last fall deter him from keeping in his hands the mastery of his party. A perusal of his life in Alfred Henry Lewis' *Richard Croker*, in which the life of the "Boss" is told most vividly, would establish this fact in the minds of those that might consider him weak-kneed. The author follows the man from the beginning of his life in New York, where he came at the age of three, through all the vicissitudes that attended him as a politician, portraying in the list of virtues. To the author the bull-dog character of associates both personal and political. Mr. Lewis has had a long acquaintance with Mr. Croker and other leaders in Tammany Hall, and is in position to write from personal knowledge. At times the author breaks out in sarcasm against what he styles the "character of mugwump moralist," who sets physical courage and strength low in the list of virtues. To the author the bull-dog character of Richard Croker is the highest and most worthy of attainment. To him the perfect savage is the perfect man. The thrilling story of the murder of Florence Scannell is the portion of the book best written. The publishers are the Life Publishing Company, New York, N. Y. Price, cloth, 372 pages, illustrated, \$2.00.

The Science of Penology, by Henry M. Boies, treats of the defence of society against crime. In spite of the great expenditure of effort and money, crime continues unabated, and it is the duty of the authorities to solve the problem. To do this a complete plan must be formulated, and it is the object of this work to present such a plan in the hope that it may aid the authorities in their work. The author first defines penology and then takes up the consideration of crime, the criminal class, and their detection, criminal codes, penalties and the reformation of criminals of all kinds, and the minor criminals and the best methods of dealing with them. Mr. Boies is a member of the board of public charities and of the committee on lunacy in Pennsylvania, and has had long experience in the administration of penal laws, and he is therefore competent to write intelligently and with authority. Published by G. P. Putnam's Sons, New York, N. Y. Cloth, 459 pages.

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